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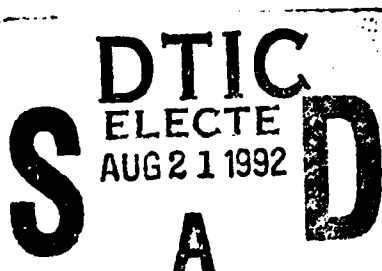
**U.S. Army Research Institute  
for the Behavioral and Social Sciences**

**Research Report 1624**

# **Training Requirements Analysis for the Combat Vehicle Command and Control System Tactical Operations Center**

**Lawrence H. O'Brien and John C. Morey**  
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## FOREWORD

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The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) provides research, development, and applications support to ensure that soldier-related issues are considered in the weapon system acquisition process. The Future Battlefield Conditions Team of the ARI Field Unit at Fort Knox performs research on soldier performance and training issues by using simulation-based evaluations to investigate concepts and early training requirements analyses of future systems such as those for command, control, and communication (C<sup>3</sup>).

This research was performed under the Science and Technology Task entitled "Training Requirements for the Future Integrated Battlefield." ARI's involvement in research on future battlefield conditions supports two Memoranda of Understanding. One, between ARI and the United States Army Armor School (USAARMS), was signed on 12 April 1989. The second, between ARI and Tank Automotive Command (TACOM), was signed on 22 March 1989.

ARI has briefed this research on the Combat Vehicle Command and Control (CVCC) System and provided results to USAARMS's Directorates of Combat Developments and Training and Doctrine, representatives from the Tank Automotive Command, and members of the German CVCC effort.

This report describes tasks for the CVCC Tactical Operations Center (TOC) workstations and assesses the tasks and skills that should be included in future training programs if a system similar to the CVCC is implemented. The information described in this report will facilitate training requirements analysis for future command and control systems.



EDGAR M. JOHNSON  
Technical Director

# TRAINING REQUIREMENTS ANALYSIS FOR THE COMBAT VEHICLE COMMAND AND CONTROL SYSTEM TACTICAL OPERATIONS CENTER

## EXECUTIVE SUMMARY

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### Requirement:

The Combat Vehicle Command and Control (CVCC) System is a set of futuristic command, control, and communication (C<sup>3</sup>) components whose functions are simulated in the Close Combat Test Bed (CCTB), formerly Simulation Networking-Developmental (SIMNET-D), developed by the Defense Advanced Research Projects Agency. Although the CVCC concept offers significant opportunities for improving operational performance, its training requirements must be assessed.

CCTB offers an alternative to comparability analysis for conducting this early training requirements analysis. Functional representations of the proposed system can be integrated into the CCTB environment. The impact on existing user tasks or the need for new tasks can be identified and assessed through hands-on developmental evaluations.

This report documents the results of a training requirements analysis conducted on the CVCC using data obtained from the CCTB.

### Procedure:

Training requirements were assessed as part of the Battalion Tactical Operations Center (TOC) Evaluation effort, whose key component was the collection of performance data during a set of realistic mission scenarios. Four 1-week evaluations with two test scenarios were conducted. The scenarios were designed to fully exercise the capabilities of TOC and vehicle systems in commanding and controlling an armor battalion in both offensive and defensive operations.

Using available documentation, task elements were identified for each of the selected tasks. Assignments for each data element were made by an analyst who had direct experience in Army battalion and brigade TOCs. Assignments were based on the experience of the analyst in directly using the CVCC and in observing its use during the Battalion TOC Evaluation. The textual information was identified and entered into the word processing system. Flow charts were then constructed to describe the sequence of task elements within a task.

Input for the training requirements analysis was obtained from the Training Evaluation Questionnaire, which was administered to participants after the two mission scenarios had been completed. This questionnaire contained two parts. In Part 1, participants rated the quality of the events and features that were part of the evaluation training program. Overall, this training program was rated quite favorably.

#### Findings:

The results of this evaluation indicated that learning difficulty and training emphasis were moderately correlated and provided unique information related to the training requirements assessment. The learning difficulty scale identified tasks and skills that were difficult to learn, and the training emphasis scale identified tasks that were critical to mission performance.

#### Utilization of Findings:

The methodology used in this evaluation identified specific tasks, skills, and knowledges that should be included in future training programs for systems similar to the CVCC. In general, the learning difficulty and training emphasis ratings on the Battalion TOC Evaluation indicate that future training programs should emphasize training on tasks and skills related to operational concepts.

# **TRAINING REQUIREMENTS ANALYSIS FOR THE COMBAT VEHICLE COMMAND AND CONTROL SYSTEM TACTICAL OPERATIONS CENTER**

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**TRAINING REQUIREMENTS ANALYSIS FOR THE COMBAT  
VEHICLE COMMAND AND CONTROL SYSTEM  
TACTICAL OPERATIONS CENTER**

**OBJECTIVE**

This research describes the results of a training requirements analysis conducted in support of the U.S. Army Research Institute (ARI) Fort Knox Field Unit's research efforts on the Combat Vehicle Command and Control (CVCC) system. The CVCC is a set of futuristic command, control, and communication (C<sup>3</sup>) components whose functions are simulated in the Close Combat Test Bed<sup>1</sup> (CCTB), formerly Simulation Networking-Developmental (SIMNET-D), developed by the Defense Advanced Research Projects Agency (DARPA). The objectives of the training requirements analysis were to (a) provide the minimum essential task information needed to support the early assessment of CVCC Tactical Operations Center (TOC) workstation training requirements and (b) assess which TOC tasks and skills should be included in future training programs.

**BACKGROUND**

**Combat Vehicle Command and Control Program**

The CVCC training requirements analysis of the CVCC system was part of the Battalion TOC Evaluation. The Battalion TOC Evaluation was the fourth in a series of research efforts that the ARI Field Unit at Fort Knox, Kentucky, recently conducted in the CCTB facility. The Evaluation used distributed interactive simulation to examine future tank technologies and built on the research from the previous levels of platoon and company to a new echelon: the battalion. The Evaluation also added the requirement for semiautomated friendly forces (BLUFOR) to be integrated in a special support role. Also, two new battalion TOC workstations for the S2 and S3 positions were evaluated, in real time, using information provided by a battalion-size maneuver element. The information obtained from the Battalion TOC Evaluation will be used to construct a detailed research plan for future CVCC battalion evaluations. In those evaluations, the performance of CVCC-equipped battalions will be compared with conventionally equipped battalions.

This report is one of the four ARI technical and research reports associated with the Battalion TOC Evaluation. The report describes the results of the task and training requirements

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<sup>1</sup>The CCTB was formerly known as the Simulation Network-Developmental (SIMNET-D) facility. The term CCTB is used throughout this document to refer to the facility. However, the term SIMNET is used to refer to the technology of distributed simulation networking.

analysis that was conducted on battalion TOC workstations. Companion reports describe the scenarios that were developed for the Battalion TOC Evaluation (Smart & Williams, in preparation), the qualitative lessons learned from the Battalion TOC Evaluation (LaVine, in preparation), and the results of the quantitative analyses of performance data collected during the Battalion TOC Evaluation (O'Brien et al., in preparation).

#### Overview of Close Combat Test Bed

CCTB refers to simulation capabilities developed under the DARPA SIMNET program. The objective of the SIMNET program was to develop a technology base for low-cost, full-crew combat system simulators. SIMNET-D utilized this technology to provide an advanced testbed for evaluating new technologies and tactics for combat weapon systems (Miller & Chung, 1987). The original SIMNET-D facility, now referred to as CCTB, includes a set of close combat vehicle simulators, an advanced capability for modeling threat and friendly forces, and extensive capabilities for data collection and display. A more detailed description of CCTB is found in DuBois (1989) and Gound and Schwab (1988).

The CVCC system was created from functional specifications that ARI developed in cooperation with TACOM. The CVCC components integrated into the CCTB provided the primary source of information for the CVCC task analysis.

#### Role of Close Combat Test Bed in Task and Training Requirements Analysis

Task analysis is a central feature of the Army's Systems Approach to Training (TRADOC Pamphlet 351-13, September 1990) and is required for all new system developments (MIL-H-46855B, Department of Defense, 1984). Meister (1985) provides four reasons for performing a task analysis:

To assist in (1) the design of the system, meaning the man-machine interface, the total job, construction of procedures, job aids, etc., (2) the manning of the system, meaning the development of the selection criteria and determination of the number and type of personnel needed, (3) the development of an instructional system, meaning the development of the curriculum, selection of critical tasks to be trained, etc., and (4) the evaluation of the completed system, by establishing performance criteria against which system personnel performance can be measured. (p. 32)

System design, training, and evaluation draw on the comprehensive task analysis conducted early in the life cycle of the proposed system. With respect to training, decisions on new system designs and how functions are allocated between the system and its users impact the training requirements for both users and maintainers. Early estimation of these training impacts,

mandated by current Department of Defense directives, provides valuable inputs to the design process. Recent developments in analytical tools and automated aids for assessing these training requirements use comparability analysis as the principal method to estimate task requirements for developmental systems (Jorgensen & O'Brien, 1983). In this approach, existing systems that are similar to the developing system in function or capability are identified. Task data for the comparable system(s) are then collected and modified to reflect the differences in design or usage between the new and comparable system. Tasks are then rated on various criteria to determine the subset of tasks having training requirements. This list provides the basis for preliminary estimates of training program estimation (e.g., training media selection) and training resource requirements such as (a) the number of students to be trained, (b) the number of instructors and support personnel required, (c) facilities requirements, and (d) training device and training equipment requirements.

CCTB offers an alternative to comparability analysis for conducting this early training requirements analysis. Functional representations of the proposed system can be integrated into the CCTB environment. The impacts on existing user tasks or the need for new tasks can be identified and assessed through hands-on developmental evaluations.

#### Overview of Combat Vehicle Command and Control Subsystems

The sections that follow present an overview of the CVCC vehicle simulators and TOC workstations. O'Brien et al. (in preparation) present a more detailed description of the CVCC.

#### Combat Vehicle Command and Control Vehicle Simulators

To represent the capabilities of the CVCC, four major subsystems were added to M1 tank simulators in the CCTB facility: Position Navigation (POSNAV) System, Command and Control Display (CCD), Commanders Independent Thermal Viewer (CITV), and Single Channel Ground and Airborne Radio System (SINCGARS). These subsystems provided Vehicle Commanders with various capabilities, as described below.

#### POSNAV System

Automatically identified the position of the tank on the battlefield in xy grid coordinates.

#### CCD

Enabled Vehicle Commanders to generate and display digital maps. These maps could display the position of all tanks in the unit as well as other objects (e.g., threats, waypoints, objectives) that had been entered in the tank's digital data base

either directly by the Vehicle Commander or by the tank's other digital systems (e.g., SINCGARS).

The CCD also allowed Vehicle Commanders to generate digital versions of their most common reports. These reports supported the incorporation of location information based on integration of data from other tank subsystems (e.g., the Laser Range Finder [LRF] and POSNAV).

The Vehicle Commander could also enter directions for reaching the next waypoint (heading, distance). These directions were directly transmitted to, and presented on the driver's steer-to display.

#### CITV

Provided the Vehicle Commander with his/her own thermal viewer, which could be pointed in a direction that was completely independent of the main gun (i.e., the gunner's primary sight). The CITV software had algorithms that could automatically identify targets. This software also allowed the Commander to prioritize multiple target locations. The priority number of each target location was displayed to the Gunner. The Gunner could then select a target priority and the main gun would automatically slew to that location.

#### SINCGARS

Enabled the transmission of digital information between tanks and the unit operations center. For example, using SINCGARS, information on the current tank's positions from POSNAV could automatically be sent to all other tanks in the unit.

#### Combat Vehicle Command and Control TOC Workstations

Figure 1 shows the CVCC battalion TOC floor plan. The battalion TOC had three major components: two automated workstations, which were designed to support the S2 and S3 functions, and a large-screen display, which provided a mechanism for depicting the Situation Display (SitDisplay) for the entire TOC staff. These components were located in a Standard Integrated Command Post System (SICPS) tent--the same type of tent that is used in the current TOC.

#### TOC Workstations

The S2 and S3 TOC workstations enabled TOC personnel to perform key command and control functions, such as receiving combat information, generating combat orders, and communicating information within the TOC and throughout the battalion. The workstations had common hardware and functional features, which are described in the next two sections.

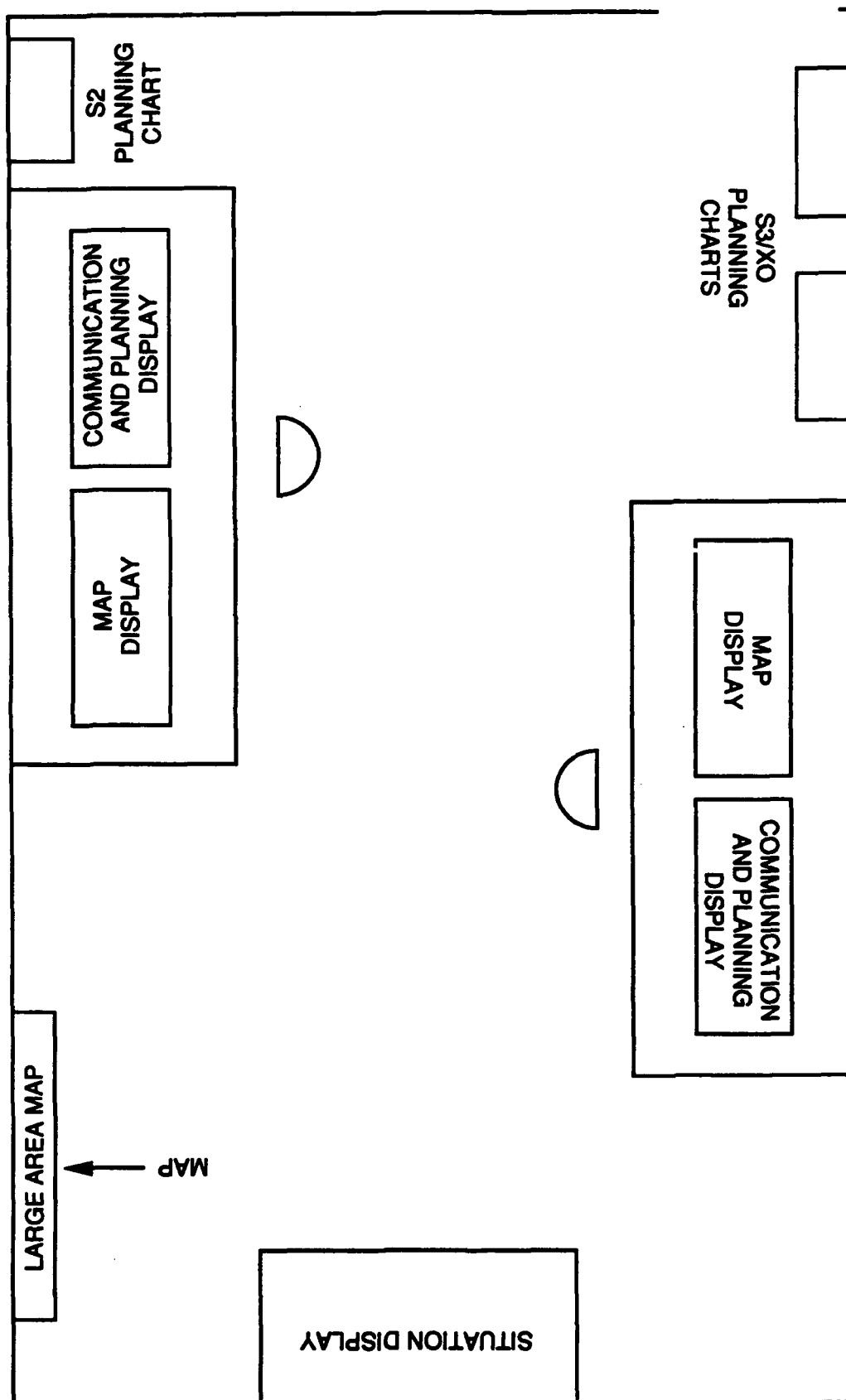


Figure 1. TOC floor plan.

## Hardware Configuration

The S2 and S3 TOC workstations consisted of a central processing unit, two 19-inch color monitors, a keyboard, and a mouse. The left-hand monitor provided a Map Display, which portrayed a digital military topographical map that users could manipulate by using the keyboard and mouse. The right-hand monitor, called the Communication and Planning Display, presented textual information received from other sources and enabled the user to create, edit, store, and transmit information generated from his/her workstation.

The workstations exchanged data on a TOC local area network (LAN). This network was tied to the CVCC network, which permitted TOC personnel to exchange intelligence and command and control information with individual CCTB M1 simulators. These networks are depicted in Figure 2.

## Major Functional Features

TOC workstation software consists of two modules: the Map Module and the Message Module.

Map module. The map module enabled users to create and edit overlays, manipulate map objects, and adjust the Map Display's features (e.g., map scale, contour lines, terrain features). This module was composed of three components: overlay, friendly vehicle icon, and message icon.

The overlay component allowed users to create individual intelligence or operational overlays and stack them as required. Users created overlays by selecting objects such as unit symbols and points of military interest, and by drawing routes, boundaries, and other graphical control measures. Users could vary the visual richness of the display by changing the stacking order of overlapping objects and by hierarchically clustering unit symbols. Hierarchically-clustered units could be represented by their superordinate unit symbol. Once created, users could edit, store, retrieve, and transmit overlays on the TOC and CVCC network.

The friendly vehicle icon component automatically received individual M1 tank position location information from the CVCC net and posted it to the Map Display. The display was dynamically updated as the vehicles maneuvered across the simulated battlefield. The user could aggregate the icons into higher level units to reduce display clutter and subsequently disaggregate as necessary.

The message icon component displayed icons that signaled the presence of messages (e.g., SPOT or CONTACT reports) received on the Communication and Planning Display. The user could link the message icon to its associated unit symbol, view the message on

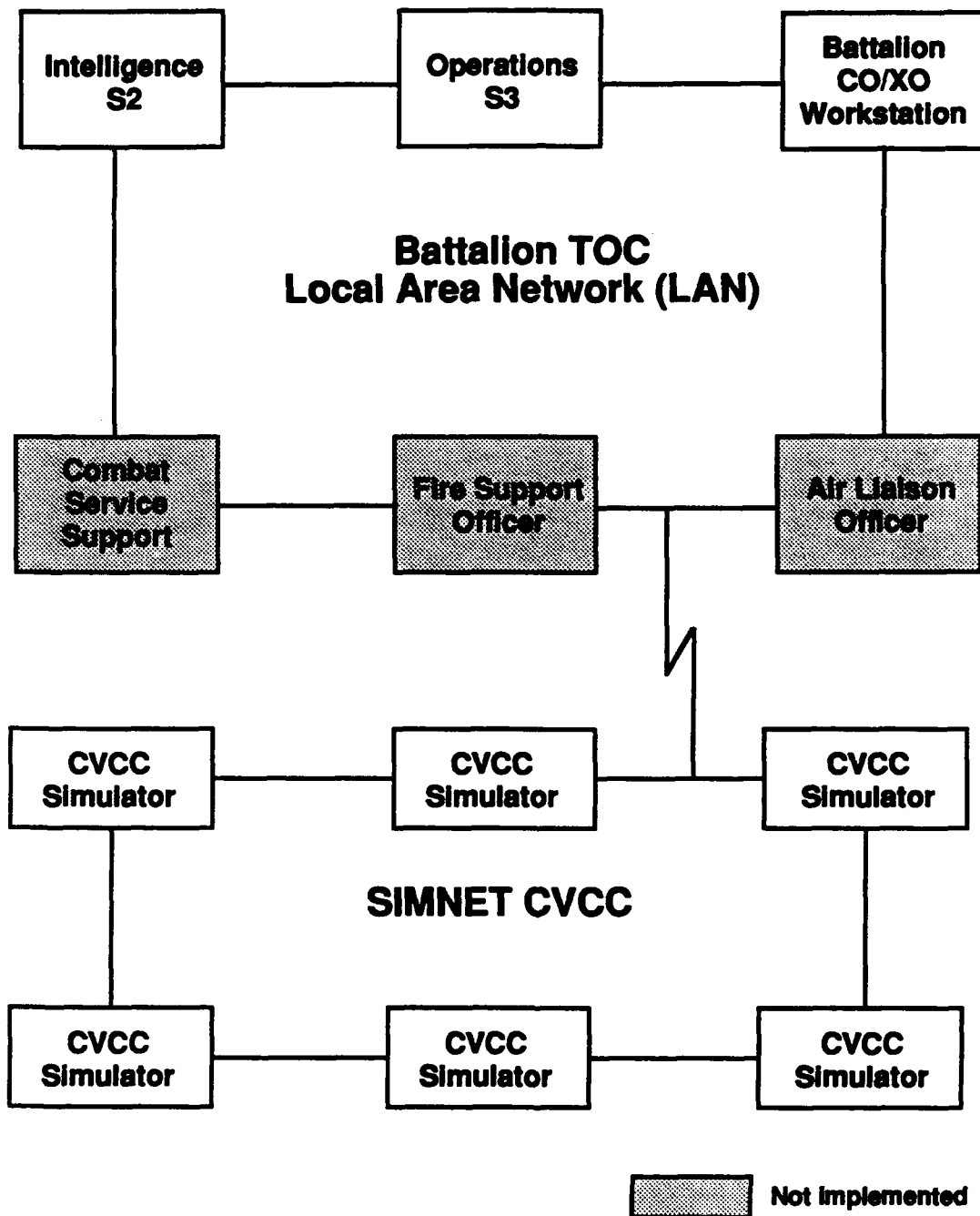


Figure 2. Battalion TOC Local Area Network interface with SIMNET.

the Communication and Planning Display, and alter the stacking order of message icons on the Map Display.

Message module. This set of functions received combat reports (e.g., SPOT, CONTACT) from the CVCC network and stored them in the TOC workstation's database. The user could create and distribute reports and manage the message file (folder) structure.

Users could perform the following operations on CVCC and Army format messages:

1. Receive incoming messages
2. Create new messages or delete existing messages
3. View the details of a message
4. Copy a message to another folder
5. Post a message to the map or SitDisplay
6. Forward a message to another TOC workstation or to a destination on the CVCC network (i.e., an M1 simulator)

Users could employ folders to manage message traffic. All new messages were automatically placed in the Infolder. The Journal folder allowed users to maintain a chronological record of events. After five minutes, reports automatically went into the journal. The Map Display folder retained the message contents associated with message icons posted on the Map Display. The Situation Display folder retained the messages associated with the message icons posted to the SitDisplay. Users could create additional user-defined folders at a TOC workstation to meet their individual needs. The folders on each TOC workstation could be viewed from the other workstation.

Users created standardized messages by calling up message-specific dialogue boxes. They read messages by viewing the message listing and selecting the desired message. When a message was received, an icon located in the appropriate location was displayed on the map.

Users could forward messages to other battalion TOC workstations, CVCC simulators, and folders, or they could delete messages.

### SitDisplay

The SitDisplay portrayed a digital military topographic map and position information similar to that on the workstation Map Display. Users could post overlays and message icons to the SitDisplay from each workstation. They could adjust features, but they could not organize or edit the overlays.

## METHODOLOGY

### Research Design

The key component of the Battalion TOC Evaluation effort was the collection of performance data during a set of realistic mission scenarios. Four one-week evaluations were conducted. During each evaluation, two test scenarios were conducted. The scenarios were designed to fully exercise the capabilities of TOC and vehicle systems in commanding and controlling an Armor Battalion in both offensive and defensive operations. (See O'Brien et al., in preparation, for a more detailed description of the research design.)

During the scenarios, the TOC was manned by a staff of five. The Operations Non-Commissioned Officer (OPS NCO) and Intelligence Non-Commissioned Officer (INTEL NCO) were the primary operators of the S3 and S2 workstations, respectively. They were supervised by the Battalion Executive Officer (XO), the Assistant Operations Staff Officer (S3), and Intelligence Officer (S2). The officers monitored the battle via a large-screen SitDisplay. Six manned simulators were used during the evaluations. These simulators were assigned to the Battalion Commander, S3, and four Company Commanders. Each vehicle was manned by a Vehicle Commander, Gunner, and Driver. The rest of the battalion was simulated by the Semiautomated Forces (SAFOR) software and test personnel. This included all vehicles at the platoon level and below, as well as the remaining positions on the battalion staff (e.g., Fire Support Officer). SAFOR personnel also simulated communications between the battalion and brigade headquarters and adjacent units.

Figure 3 shows the schedule for the battalion TOC evaluations. Each evaluation had the same schedule. During the first day of an evaluation, participants received detailed individual training on the skills and tasks directly associated with the operation of the TOC workstations or vehicle subsystems. During the morning session of Day 2, TOC personnel received a series of practice exercises on critical tasks. At the same time, tank crews began their collective training. The afternoon session of Day 2 and the morning session of Day 3 were devoted to collective training exercises. These exercises were used to develop the crew coordination skills needed to effectively utilize the CVCC design elements in an integrated fashion.

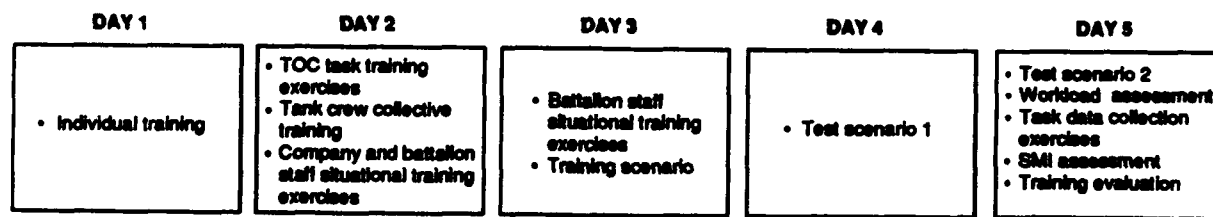


Figure 3. Overview of evaluation schedule.

During the afternoon session of Day 3, the entire battalion practiced working together in a training scenario that had the same structure and format as the two test scenarios.

During Day 4, Test Scenario 1 was conducted, and on the morning of Day 5, Test Scenario 2 was conducted. During the remaining portion of Day 5, a series of questionnaires was given to obtain information on soldier assessments of the CVCC Soldier-Machine Interface (SMI), training packages, operator workload requirements, and information effectiveness.

### Subjects

Each evaluation required 23 participants. The TOC was manned by a five-man staff consisting of the Battalion XO, Assistant S3, the Battalion S2, an OPS NCO, and an INTEL NCO. Six vehicles were used in the evaluation. Each vehicle had a three-man crew consisting of a Vehicle Commander, Gunner, and Driver. The six Vehicle Commanders played the roles of the Battalion Commander, S3, and four Company Commanders. All other members of the battalion were simulated by the SAFOR software or control room personnel.

### Training Requirements Methodology

Input for the training requirements analysis was obtained from the Training Evaluation Questionnaire, which was administered to participants after the two mission scenarios had been completed. This questionnaire contained two parts. In Part 1, participants rated the quality of the events and features that were part of the evaluation training program. Overall, this training program was rated quite favorably. Detailed results for Part 1 of the questionnaire are described in O'Brien et al. (in preparation).

Part 2 of the Training Evaluation Questionnaire, which had three questions, was designed to assess participants' views on the CVCC-related tasks and skills that should be trained in future training programs (see O'Brien et al., in preparation). On Question 1, participants were asked to rate how much emphasis should be placed in training key skills and knowledges related to the CVCC. On Question 2, participants were asked to rate the learning difficulty of these same skills and knowledges. On Question 3, the participants were asked to rate how much emphasis should be placed in training key tasks related to the CVCC. Two versions of this part of the questionnaire were developed: one for TOC personnel and another for Vehicle Commanders. Both versions of the questionnaire are provided in Appendix A.

The training emphasis and learning difficulty scales that were used in the Training Evaluation Questionnaire were taken directly from TRADOC PAM 351-13 (September 1990). Both scales, listed in Table 1, have been successfully used in the Army Occupational Survey Program. The purpose of the learning

difficulty scale is to determine the relative time required to train a task. The scale is typically applied by asking subject matter experts (SMEs) to rate tasks they performed, supervised, or observed. In providing the ratings, the SMEs are asked to consider the time it takes an incumbent to learn to perform the task satisfactorily--the more time required, the higher the level of learning difficulty. TRADOC PAM 351-13 (September 1990) describes the training emphasis scale as follows:

Training Emphasis (TE) scale. TE scale ratings, obtained from SMEs or supervisors, comprise the most useful single training factor for critical task selection. The TE scale is based on extensive research conducted by the Department of Air Force and the Department of the Army and is recommended for all surveys. (p. 30)

Table 1

Training Requirements Scales

<u>Training emphasis</u>	<u>Learning difficulty</u>
1 - Very low emphasis	1 - Extremely low learning difficulty
2 - Low emphasis	2 - Low learning difficulty
3 - Less than average emphasis	3 - Somewhat below average
4 - Average emphasis	4 - Average learning difficulty
5 - More than average emphasis	5 - Somewhat above average
6 - High emphasis	6 - High learning difficulty
7 - Very high emphasis	7 - Extremely high learning difficulty

The skills and knowledges that were included in the Training Evaluation Questionnaire were identified by examining the CCD and CITV training modules, which were presented to Vehicle Commanders, and the workstation Map and Message Display Training modules, which were presented to TOC personnel.

The tasks in the Training Evaluation Questionnaire were the same tasks used in the workload analysis. The tasks in the Vehicle Commander version of the questionnaire were a subset of the tasks that were used in the CVCC company-level workload evaluation (Morey, Wigginton, and O'Brien, in preparation). Table 2 displays the Vehicle Commander tasks that were included in the Training Evaluation Questionnaire. Tasks for the TOC personnel were derived from the following sources:

- STP 21-II-MQS, Military Qualification Standards II, Manual of Common (Officer) Tasks (Department of the Army, 1987).

- FC 71-6, Battalion and Brigade Command and Control (Department of the Army, 1985).

- FM 101-5, Staff Organizations and Operations (Department of the Army, 1984).

- Soldier Training Publications (Soldier Manuals and Trainer's Guide) for MOS 96B, Intelligence Analyst (Department of the Army, 1985).

Table 2

Vehicle Commander Tasks

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- Prepare and send SPOT report
- Prepare and send CONTACT report
- Prepare and send SHELL report
- Prepare and send CALL FOR FIRE (CFF) report
- Prepare and send SITUATION report (SITREP)
- Direct actions of gunner (including fire commands)
- Determine location
- Direct a scheme of maneuver
- Monitor/correct route progress
- Monitor/correct platoon positions within company
- Coordinate sector searches
- Revise/update tactical plan

---

Table 3 lists the TOC tasks that were used in the Training Evaluation Questionnaire and the data sources associated with each task. Whenever possible, task statements from the designated sources were used. However, in some cases, it was necessary to restate the task descriptions to make them more appropriate for the CVCC scenarios.

### Task Analysis Methodology

The primary goal of the TOC workstation task analysis was to identify the minimum essential elements of information needed to support an "early" assessment of training requirements for the CVCC TOC workstations.<sup>2</sup> Because only a functional representation of the CVCC was evaluated, implementation of a detailed task analysis as specified in Army training development procedures (i.e., TRADOC Form 550) was not warranted.

---

<sup>2</sup>A task analysis of CVCC Vehicle Commander tasks was completed in a previous effort.

Table 3

## TOC Personnel Tasks

Tasks	Task sources		
	MOS STP 21-II-MQS	STP 34-96B	FM 101-5 FC 71-6
Identify and assess alternative friendly course of action (XO, OPS NCO)			X
Monitor battle and decide on need for action or change			X
Determine threat probable courses of action (S2, INTEL NCO)	X	X	
Monitor maintenance of section journal (S2, XO)	X		
Monitor maintenance of the situation map and preparation of the situation overlay (S2, XO)	X		
Evaluate incoming information in terms of pertinence, accuracy, and reliability	X		
Supervise the threat evaluation effort (S2, XO)	X		
Supervise dissemination of information (S2, XO)			X
Present situation update (S2, XO, OPS NCO, INTEL NCO) to Battalion Commander		X	X
Maintain section journal and journal file		X	
Prepare and maintain situation map and associated overlays		X	
Extract, categorize, and file information from incoming messages		X	
Prepare an overlay		X	X
Disseminate information to battalion			X
Prepare battalion FRAGOs			X

Table 4 displays the information items that were selected for inclusion in the task analysis. The items were chosen by selecting a subset of the information elements used in traditional Army task analyses (i.e., TRADOC Form 550). We attempted to select the items that were most relevant to early training requirements assessment. A detailed definition of the elements in Table 4 is provided in the following section.

Table 4

Task Analysis Data Elements

Data element	Primary method of documentation
Task title	
Duty position	Textual data base
Conditions of performance	Textual data base
Initiating cues	Textual data base
Terminating cues	Textual data base
Feedback cues	Textual data base
Task elements	Textual data base
- Displays	Textual data base
- Controls	Textual data base
Task element sequencing	Flow chart

Task Analysis Data Element Definition

Task Level

Task number. Arbitrary number used to identify a specific task within the data base.

Task title. Title of task performed on CVCC.

Duty position. Identification of CVCC TOC personnel who perform the task. One or more of the following:

- XO
- NCO
- Intelligence Staff Officer (S2)
- Intelligence NCO

Conditions of performance. Conditions under which the task is performed.

Initiating cues. Cues that cause the CVCC user to begin the task.

Terminating cues. Cues that indicate to the user that he/she no longer has to perform the task.

Feedback cues. Cues that the user might receive during the performance of a task. Provides information on how well the task is being performed.

Comments. Anomalies associated with any of the data entries.

**Skills.** Psychomotor or perceptual skills associated with the task.

**Knowledge.** Types of cognitive information associated with the task.

### **Task Element Level**

**Task element number.** Arbitrary number used to identify a specific task element within a task.

**Task element title.** Title of task element.

**Displays.** Specific displays used in performing the task element.

**Controls.** Specific controls used in performing the task element.

### **Tools for Documenting Task Analysis**

Two tools were selected to record and document the information collected during the task analysis. First, a microcomputer-based data base word processor (WordPerfect 5.1, WordPerfect Corporation, 1989) was used to record the textual information items (e.g., task titles). Task elements were identified for each task. The controls and displays associated with each task element were then identified (see Figure 4). Second, a microcomputer-based flow chart program (MacFlow, Mainstay 1990) was used to describe the sequencing of task elements within a task. Figure 5 provides an example of one of the flow charts that was produced with this program.

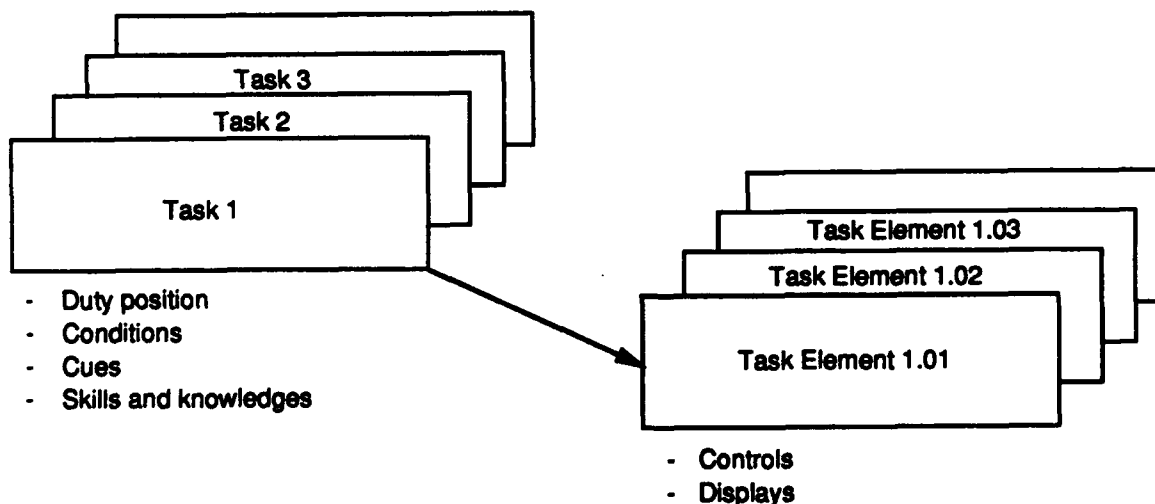
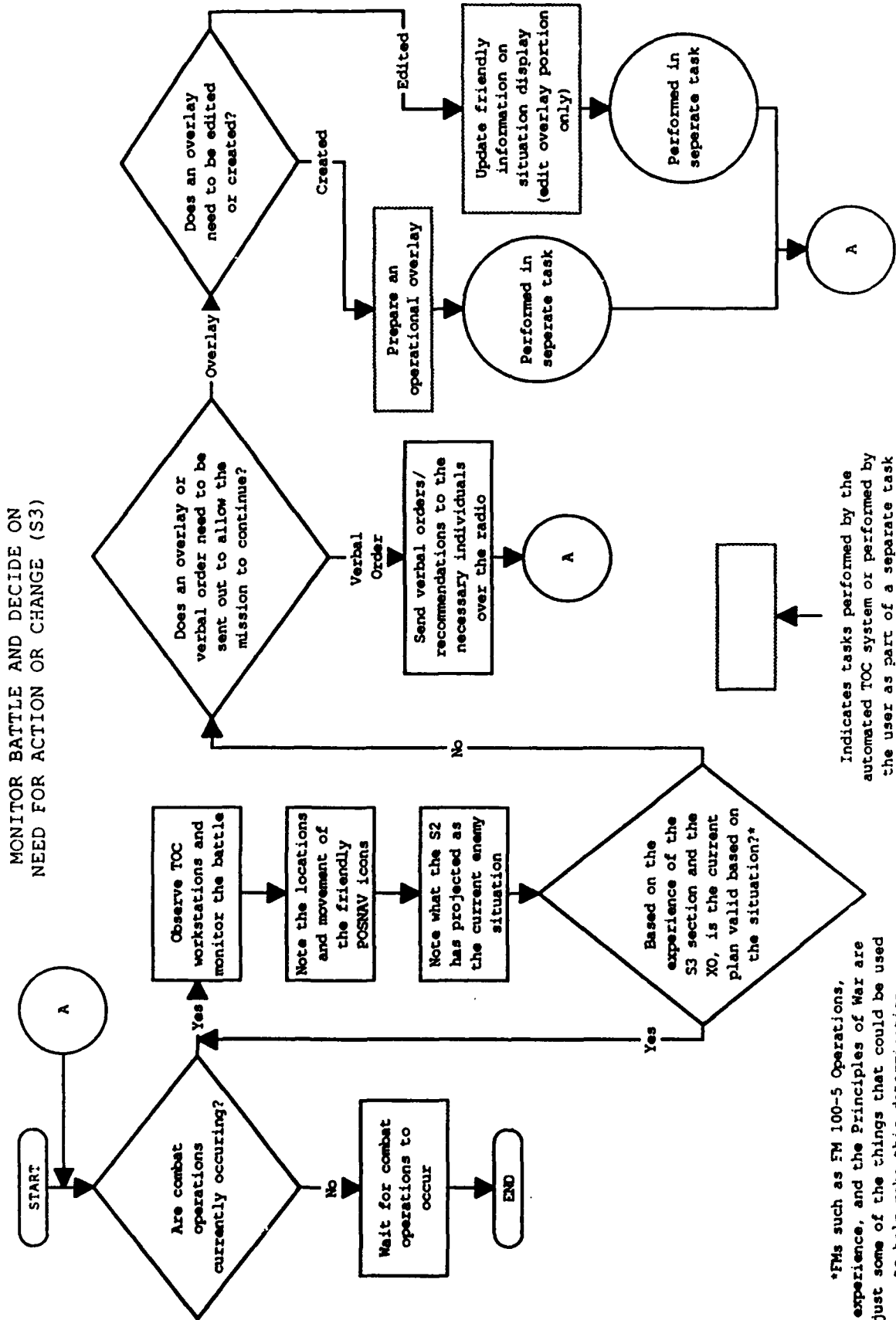


Figure 4. Task analysis data elements.



\*FMs such as FM 100-5 Operations, experience, and the Principles of War are just some of the things that could be used to help make this determination.

Figure 5. Example flow chart.

### Selection of Tasks For Detailed Analysis

Resource constraints limited the number of tasks that could be analyzed. As a result, we focused on those tasks that are most closely related to CVCC hardware and software. Table 5 lists these tasks. In some cases, tasks for the S2 and S3 sections were analyzed separately so that the unique activities of these two sections could be captured.

Table 5

#### TOC Tasks Selected for Detailed Analysis

---

Prepare an overlay

- Prepare an operational overlay
- Prepare an intelligence overlay

Prepare and maintain situation map and associated overlays

- Update friendly information on situation display
- Update threat information on situation display

Monitor battle and decide on need for action or change

- Monitor battle and decide on need for action or change (S3)
- Monitor battle and decide on need for action or change (S2)

Analyze and assess alternative friendly courses of action

Analyze and assess alternative threat courses of action

Disseminate overlay to battalion

Maintain section journal

Prepare battalion FRAGO

---

Appendix B provides a complete listing of textual items that were identified for these tasks. Flow charts for the task analyses are listed in Appendix C.

### Task Analysis Process

Task elements were identified for each of the selected tasks using available documentation. Assignments for each data element were made by an analyst who had direct experience in Army battalion and brigade TOCs. Assignments were based on the experience of the analyst in directly using the CVCC and in observing users employing the CVCC during the Battalion TOC Evaluation. The textual information was identified and entered into the word processing system. Flow charts were then constructed to describe the sequence of task elements within a task.

## TRAINING REQUIREMENTS ANALYSIS RESULTS

### Skill and Knowledge and Training Emphasis Relationships

In responding to the Training Evaluation Questionnaire, participants were asked to provide both training emphasis and learning difficulty ratings for the same set of skills and knowledges. Table 6 lists the skills and knowledges that were included in the questionnaire. Pearson product moment correlations (Norusis, 1988) were calculated between these two sets of ratings for both Vehicle Commanders and TOC personnel. The median correlation between the two sets of ratings for Vehicle Commanders was .39 and for TOC personnel was .16. Correlational matrices for these variables are presented in Appendix D. Thus, the results provide evidence of a low to moderate relationship between the two scales, indicating that the two scales tap into distinctively different aspects of training requirements.

Table 6

Skills and Knowledges Included in the Training Evaluation Questionnaire

Vehicle Commanders	TOC personnel
Operating SIMNET-unique controls and displays (other than CITV and CCD)	Basic computer skills (e.g., use of mouse)
CITV manual search	Creation of overlays
CITV auto scan	Editing of overlays
CITV target designate	Sending overlays
Operating in GPS mode	Aggregating/disaggregating friendly icons
Operating CCD input devices	Manipulating message icons
Operating CCD map functions	Composing reports
Aggregation of CCD map icons	Reviewing reports from vehicles
Composing reports	Organizing reports
Retrieving and reviewing reports	Coordination with Battalion Commander and S3
Sending reports	Coordination among TOC staff
Coordination with gunner	Coordination with Tank Commanders
Coordination with driver	Operational usage of TOC workstations
Coordination with other Tank Commanders	Potential TOC workstation operational procedures
Coordination with TOC	
Retrieving and reviewing TOC overlays	
Operational usage of CVCC	

## Results for Vehicle Commanders

### Learning Difficulty

Table 7 presents the mean score for the learning difficulty ratings for CVCC-related skills and knowledges. No skills and knowledges received a rating above 5, Somewhat Above Average. However, 9 of the 18 skills and knowledges had mean greater than 4, Average Learning Difficulty. **CITV manual search** had the lowest rated learning difficulty. **Operational use of the CVCC** had the highest mean learning difficulty rating. Results from Part 1 of the Training Evaluation Questionnaire indicated that 9.1% of the Vehicle Commanders stated that the Battalion TOC Evaluation program did not provide enough training on operational concepts (see O'Brien et al., in preparation). **Operating CCD input devices** also had a relatively high mean learning difficulty score. The SMI analysis in O'Brien et al. (in preparation) identified several potential problems with the Vehicle Commander input devices. For example, 75% of the Battalion Commanders and S3s, and 56% of the Company Commanders rated the thumb cursor borderline or below. Sixty-two percent of the Battalion Commanders and S3s, and 75% of the Company Commanders rated the system response time borderline or below. Other skills and knowledges receiving high ratings were **Retrieve and review TOC overlays**, **Operate CCD map functions**, and **Compose reports**.

### Training Emphasis

Table 8 presents the mean training emphasis ratings for Vehicle Commander skills and knowledges. As with the learning difficulty ratings, **Operational use of the CVCC**, **retrieving and reviewing TOC overlays**, **Operating CCD input devices**, and **Operating CCD map functions** all had relatively high mean training emphasis ratings. It is interesting to note that **Operating CCD navigation functions** received a high training emphasis rating but had a relatively lower mean learning difficulty rating, suggesting that the high training emphasis ratings for this skill reflected its high potential payoff to mission success rather than its learning difficulty.

Tables 2 and 3 list the Vehicle Commander and TOC personnel tasks, respectively, that were used in the training emphasis portion of the questionnaire. Table 9 presents the mean training emphasis ratings for Vehicle Commander tasks. The two tasks with the highest mean ratings were **Direct a scheme of maneuver** and **Revise tactical plan**. Both of these tasks are higher level tasks that required extensive utilization of the knowledges related to the operational use of the CVCC. **Prepare and send SPOT report** and **Prepare and send SITREP** also had high training emphasis ratings. As O'Brien et al. (in preparation) indicated, these two tasks had the highest mean workload and were the most complex reporting tasks.

Table 7

## Vehicle Commanders: Learning Difficulty Ratings

Task	Mean	StD	CVA	Range	
				Min	Max
Operate SIMNET controls	3.12	1.30	.41	1.00	6.00
CITV manual search	2.67	.82	.31	2.00	5.00
CITV auto scan	3.83	1.17	.30	2.00	6.00
CITV target designate	3.04	1.04	.34	2.00	5.00
Operate in GPS mode	3.00	.98	.33	1.00	5.00
Operate CCD input devices	4.46	.93	.21	2.00	6.00
Operate CCD map functions	4.33	.87	.20	2.00	6.00
Operate CCD navigate functions	4.17	.87	.21	3.00	6.00
Aggregate CCD icons	4.08	1.18	.29	2.00	6.00
Compose reports	4.46	1.14	.26	2.00	6.00
Retrieve and review reports	4.25	1.07	.25	2.00	6.00
Send reports	3.83	1.27	.33	1.00	6.00
Coordinate with gunner	3.50	1.18	.34	2.00	7.00
Coordinate with driver	3.17	1.09	.34	1.00	6.00
Coordinate with other Vehicle Commanders	3.88	1.26	.33	1.00	7.00
Coordinate with TOC	4.13	1.15	.28	2.00	6.00
Retrieve and review TOC overlays	4.50	1.25	.28	2.00	7.00
Operational use of CVCC	4.71	1.23	.26	1.00	7.00

Note. N = 24.

Table 8

## Vehicle Commanders: Skills and Knowledges Training Emphasis Ratings

Task	Mean	Std	CVa	Range	
				Min	Max
Operate SIMNET controls	3.65	1.27	.35	2.00	7.00
CITV manual search <sup>a</sup>	4.09	1.02	.25	2.00	6.00
CITV auto scan	4.96	.82	.17	4.00	7.00
CITV target designate	5.04	1.07	.21	4.00	7.00
Operate in GPS mode	4.13	1.22	.29	2.00	7.00
Operate CCD input devices	5.61	1.08	.19	3.00	7.00
Operate CCD map functions	5.96	.98	.16	4.00	7.00
Operate CCD navigate functions	5.83	.89	.15	4.00	7.00
Aggregate CCD icons	4.52	1.31	.29	2.00	7.00
Compose reports	5.48	1.20	.22	2.00	7.00
Retrieve and review reports	5.48	.99	.18	4.00	7.00
Send reports	5.43	.95	.17	4.00	7.00
Coordinate with gunner	5.22	1.17	.22	3.00	7.00
Coordinate with driver	4.78	1.17	.24	3.00	7.00
Coordinate with other Vehicle Commanders	5.13	1.36	.26	2.00	7.00
Coordinate with TOC	5.13	1.18	.23	2.00	7.00
Retrieve and review TOC overlays	5.52	1.04	.19	3.00	7.00
Operational use of CVCC	5.87	.87	.15	4.00	7.00

Note. N = 23. <sup>a</sup>N = 22.

Table 9

## Vehicle Commanders: Task Training Emphasis Ratings

Task	Mean	Std	CVa	Range	
				Min -	Max
SPOT report	5.13	1.39	.27	2.00 -	7.00
CONTACT report	4.09	1.76	.43	1.00 -	7.00
SHELL report	3.48	.99	.29	2.00 -	6.00
CALL FOR FIRE report <sup>a</sup>	4.59	1.33	.29	2.00 -	7.00
SITUATION report	5.00	1.09	.22	3.00 -	7.00
Direct gunner	4.13	1.71	.41	1.00 -	7.00
Determine location	4.13	1.82	.44	1.00 -	7.00
Direct scheme of maneuver	5.30	1.40	.26	1.00 -	7.00
Monitor route progress	4.48	1.31	.29	2.00 -	7.00
Correct company position with Battalion	4.70	1.26	.27	2.00 -	7.00
Revise tactical plan <sup>b</sup>	5.55	1.10	.20	3.00 -	7.00
Coordinate sector searches	4.83	1.19	.25	2.00 -	7.00

Note. N = 23. <sup>a</sup>N = 22. <sup>b</sup>N = 22.

## Results for TOC Personnel

Learning Difficulty

Table 10 presents the mean scores for the learning difficulty ratings for CVCC TOC workstation skills and knowledges. No skills and knowledges received a rating above 5, Somewhat Above Average. However, 7 of the 18 skills and knowledges had mean ratings greater than 4, Average Learning Difficulty. The two skills and knowledges with highest mean learning difficulty scores were **Potential workstation operational procedures** and **Operational use of the CVCC**. As indicated in O'Brien et al. (in preparation), TOC personnel were not provided with a standard operating procedure (SOP) for using the CVCC TOC workstations. Each group was free to develop its own SOP. Because the quality and quantity of the information distribution process was quite different in the CVCC, these groups could not rely on SOPs learned in previous assignments. Observations of test personnel indicate that the procedures that were developed varied across groups. Results from Part 1 of the Training Evaluation Questionnaire indicate that 22.2% of the TOC personnel indicated that the Battalion TOC Evaluation program did not provide enough training on operational concepts (see O'Brien et al., in preparation). Two other tasks requiring extensive utilization of operational procedures, **Coordination with the Battalion Commander and S3** and **Coordination among TOC staff**, also had high learning difficulty ratings. **Create overlays** and **Edit overlays** also had high mean learning difficulty ratings.

Preparation of overlays also received the highest workload ratings for TOC personnel tasks (see O'Brien et al., in preparation).

Table 10

TOC Personnel: Learning Difficulty Ratings

Task	Mean	Std	CVa	<u>Range</u>	
				Min	Max
Basic computer skills	3.53	1.39	.39	1.00	6.00
Create overlays	4.63	1.01	.22	3.00	6.00
Edit overlays	4.47	1.17	.26	2.00	6.00
Send overlays	3.53	1.43	.41	1.00	6.00
Aggregate/disaggregate friendly icons	3.21	1.40	.44	1.00	5.00
Manipulate message icons	3.32	1.45	.44	1.00	6.00
Compose reports	4.11	1.15	.28	2.00	6.00
Review vehicle reports	3.42	1.46	.43	1.00	6.00
Organize reports	3.74	1.45	.39	1.00	7.00
Coordinate with Battalion Commander and S3	4.32	1.20	.28	2.00	7.00
Coordinate among TOC staff	4.32	1.29	.30	1.00	7.00
Coordinate with Vehicle Commanders	3.95	1.31	.33	1.00	6.00
Operational use of TOC workstations	4.95	1.22	.25	3.00	7.00
Potential TOC workstation operational procedures	5.00	1.15	.23	3.00	7.00

Note. N = 19.

### Training Emphasis

Table 11 presents the mean training emphasis ratings for TOC skills and knowledges. As Table 11 indicates, the training emphasis ratings directly parallel the results of the learning difficulty ratings. Skills related to operational usage (Potential workstation operational procedures and Operational use of the CVCC) and use of the overlays (Create overlays and Edit overlays) had relatively high mean scores. As with the learning difficulty ratings, Coordination with the Battalion Commander and S3 and Coordination among TOC staff also had high training emphasis ratings; however, unlike the learning difficulty ratings, Coordination with Vehicle Commanders also had high training emphasis ratings, perhaps reflecting the high potential payoffs associated with practicing this skill.

Table 11

## TOC Personnel: Skills and Knowledges Training Emphasis Ratings

Task	Mean	Std	CVa	Range	
				Min	Max
Basic computer skills	4.89	1.33	.27	3.00	7.00
Create overlays	6.26	.81	.13	5.00	7.00
Edit overlays	6.21	.92	.15	4.00	7.00
Send overlays	4.79	1.55	.32	2.00	7.00
Aggregate/disaggregate friendly icons	4.00	1.53	.38	1.00	7.00
Manipulate message icons	4.84	1.64	.34	1.00	7.00
Compose reports	5.42	1.30	.24	3.00	7.00
Review vehicle reports	4.79	1.47	.31	1.00	7.00
Organize reports	4.79	1.23	.26	2.00	7.00
Coordinate with Battalion Commander and S3	5.68	1.38	.24	2.00	7.00
Coordinate with TOC staff	5.84	1.01	.17	4.00	7.00
Coordinate with Vehicle Commanders	5.21	1.58	.30	1.00	7.00
Use of TOC workstations	6.26	.73	.12	5.00	7.00
Potential TOC workstation procedures	6.11	1.10	.18	3.00	7.00

Note. N = 19.

Table 12 presents the mean training emphasis ratings for TOC personnel tasks. Two tasks with high mean ratings involve preparation of overlays: Prepare battalion FRAGO and Prepare overlay. Preparation of overlays also had the highest rated workload of any TOC task (see O'Brien et al., in preparation). Three of the tasks with high training emphasis ratings involved monitoring the ongoing battle: Monitor the battle and determine the need for a change of action; Disseminate information to the battalion; and Evaluate incoming information in terms of pertinence, accuracy, and reliability. These high ratings probably reflect the criticality of these tasks to the overall TOC section mission. Determine threat courses of action also had a relatively high mean training emphasis scale. As the discussion of the results of the information analysis indicated (see O'Brien et al., in preparation), a sizeable percentage of Vehicle Commanders indicated that they did not receive information on key items related to the assessment of alternative threat courses of action from the TOC. For example, 57% of the Vehicle Commanders indicated that they did not receive information on enemy vulnerabilities from the TOC. Sixty five percent of the Vehicle Commanders indicated that they did not receive information on enemy strength from the TOC. The lack of information on alternative threat courses of action was probably due to the fact that the CVCC TOC did not focus on planning for the future battle and, thus, did not include extensive aids (e.g., templates), procedures, or training for this type of

activity. Finally, two tasks involving use of the SitDisplay (Prepare and maintain situation map and associated overlays and Prepare situation update) also had relatively high mean scores. As O'Brien et al. (in preparation) indicated, during the Battalion TOC Evaluation, TOC personnel did not use the SitDisplay very much. It was speculated that this may have been due to the layout of the TOC, which made it difficult for TOC personnel to monitor the SitDisplay and the TOC workstations.

Table 12

TOC Personnel: Task Training Emphasis Ratings

Task	Mean	Std	Cva	Range	
				Min	Max
Disseminate information to battalion	5.63	1.12	.20	4.00	7.00
Monitor battle and determine change	6.00	1.11	.18	4.00	7.00
Prepare battalion FRAGO	5.74	1.15	.20	4.00	7.00
Identify friendly courses of action	5.05	2.01	.40	0.00	7.00
Evaluate incoming information	5.74	1.33	.23	3.00	7.00
Maintain section journal and journal file	4.11	1.45	.35	2.00	7.00
Prepare situation map	5.95	1.13	.19	4.00	7.00
Categorize incoming information	5.00	1.15	.23	3.00	7.00
Determine threat courses of action	5.79	1.72	.30	0.00	7.00
Prepare overlay	6.05	1.03	.17	4.00	7.00
Monitor maintenance of section journal	3.58	1.84	.51	0.00	6.00
Monitor maintenance of situation map	4.16	2.19	.53	0.00	7.00
Supervise threat evaluation	4.47	2.37	.53	0.00	7.00
Supervise dissemination of information	4.58	2.32	.51	0.00	7.00
Present situation update	6.21	1.08	.17	4.00	7.00

Note. N = 19.

## DISCUSSION/CONCLUSIONS

The methodology employed in this evaluation identified specific tasks, skills, and knowledges that should be included in future training programs for systems similar to the CVCC. In general, the Battalion TOC Evaluation learning difficulty and training emphasis ratings indicate that future training programs should emphasize training on tasks and skills related to operational concepts. The results indicated that learning difficulty and training emphasis were moderately correlated and provided unique information related to the training requirements assessment. The learning difficulty scale identified tasks and skills that were difficult to learn, and the training emphasis scale identified tasks that were critical to mission performance.

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## Appendix A

### Training Assessment Questionnaires

#### **QUESTIONNAIRE ADMINISTRATION INSTRUCTIONS-TRAINING EVALUATION**

---

1. Make sure that all evaluation participants are present. Write down the time when all members are present.

2. Describe the objective of the questionnaire using the following:

This questionnaire has two purposes. The first is to obtain your views on the effectiveness of the training you received this week. The second is to obtain your views on what should be emphasized in future training programs.

3. Ask the Vehicle Commanders to identify themselves. Hand them the Training Evaluation Questionnaires marked "Vehicle Commander" at the top. Ask the Gunners and Drivers to identify themselves. Hand them the Training Evaluation Questionnaires marked "Gunners and Drivers" at the top. Ask the TOC personnel to identify themselves. Hand them the Training Evaluation Questionnaires marked "TOC" at the top. When this is done, tell the participants to start making their ratings. Tell them to begin by circling the position they played during the evaluation. Write down the time. If at any time they have problems in filling out the questionnaire, tell them to raise their hand and let you know. Record these problems.

4 April 1991

**VEHICLE COMMANDER**

YOUR DUTY POSITION: Bn Cdr S3 CoCdrA CoCdrB CoCdrC CoCdrD (circle one)  
 DATE: \_\_\_\_\_ ROSTER NO: \_\_\_\_\_

**TRAINING EVALUATION QUESTIONNAIRE****PART 1: Evaluation of Test Training Program**

We are interested in your views about the training you received this week on the TOC workstations. The questions listed below will ask to rate various components of the training program. Please make your ratings using the following five-point scale.

1	2	3	4	5
Poor	Fair	Average	Good	Excellent

1. How adequate were the components of the training program in preparing you to operate the CCD and the CITV?

**CLASSROOM TRAINING:****CCD****CITV**

1a. Classroom Sessions - Overall

\_\_\_\_\_

\_\_\_\_\_

1b. Instructor's Presentation

\_\_\_\_\_

\_\_\_\_\_

1c. Viewgraphs

\_\_\_\_\_

\_\_\_\_\_

1d. Handouts

\_\_\_\_\_

\_\_\_\_\_

1e. Examples of Tactical Equipment Use

\_\_\_\_\_

\_\_\_\_\_

**HANDS-ON SIMULATOR TRAINING:**

1f. Hands-On - Overall

\_\_\_\_\_

\_\_\_\_\_

1g. RA Explanations

\_\_\_\_\_

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1h. Hands-On Training

\_\_\_\_\_

\_\_\_\_\_

Explain reasons for "Poor" or "Fair" ratings, if any: \_\_\_\_\_

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### Training Evaluation

2. How adequate were the tactical training exercises in preparing you to use the CVCC in a tactical situation?

1	2	3	4	5
Poor	Fair	Average	Good	Excellent
2a.	Tank Crew Training			_____
2b.	Company Situational Training Exercises			_____
2c.	Bn Staff Situational Training Exercises			_____
2d.	Bn Situational Training Exercises			_____
2e.	Training Scenario			_____

3. How adequate were the following general training sessions?

3a.	General Introduction to TOC Evaluation	_____
3b.	CCD/TOC Demonstration	_____
3c.	Workload Orientation	_____
3e.	TOC Training Review/Free Play	_____

Explain reasons for any "Poor" or "Fair" ratings, listed above:  
(List Question # beside response.)

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### TRAINING EVALUATION

4. Were there any CVCC functions that you did not use during the test scenarios and exercises due to lack of effective training? YES\_\_\_\_\_ NO\_\_\_\_\_

If YES, which ones?

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5. Rate how well you were trained to perform the tasks required in the test scenario using the following scale.

1	2	3	4	5
Poor	Fair	Average	Good	Excellent

Explain reasons for "Poor" rating:

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6. Did the classroom instruction provide enough information about the operational concepts underlying the new CVCC?

YES\_\_\_\_\_ NO\_\_\_\_\_

Explain reasons for no answer:

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## TRAINING EVALUATION

7. Are there any parts of the training program you think should be eliminated or de-emphasized? YES\_\_\_\_\_ NO\_\_\_\_\_

Explain reasons for yes answer:

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8. Do you have any suggestions on how to improve the test training program?

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Additional Comments:

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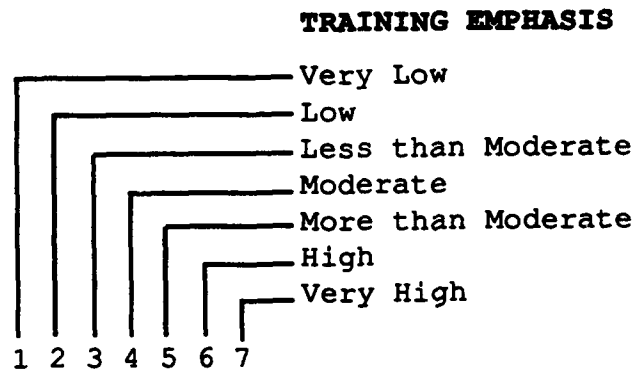
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## PART 2: Future Training Requirements

The answers you provide in this section will help the Army determine training requirements for new systems similar to the one you have worked with this week.

1. If the Army were to implement a system like the TOC Workstations, how much emphasis should be placed in training each of the skills, knowledges and tasks listed below. In making your ratings, use the following scale.



### SKILLS AND KNOWLEDGES

Operating SIMNET - Unique Controls & Displays  
(Other then CITV and CCD)

\_\_\_\_\_

CITV Manual Search

\_\_\_\_\_

CITV Auto Scan

\_\_\_\_\_

CITV Target Designate

\_\_\_\_\_

Operating in GPS Mode

\_\_\_\_\_

Operating CCD Input Devices

\_\_\_\_\_

Operating CCD Map Functions

\_\_\_\_\_

Operating CCD Navigate Functions

\_\_\_\_\_

Aggregation of CCD Map Icons

\_\_\_\_\_

Composing Reports

\_\_\_\_\_

Retrieving and Reviewing Reports

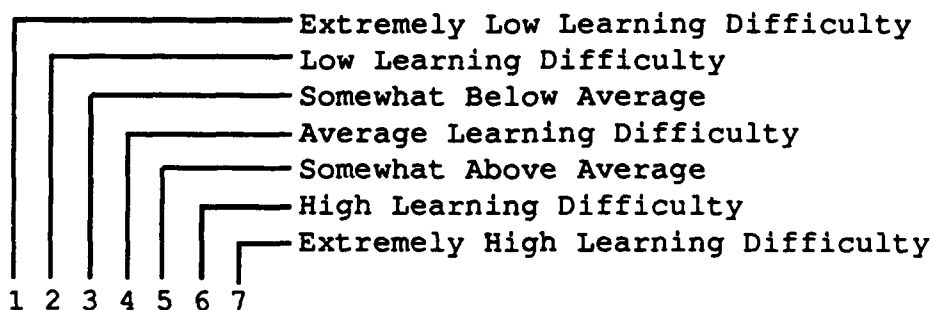
\_\_\_\_\_

## SKILLS AND KNOWLEDGES (Cont.)

Sending Reports	_____
Coordination with Gunner	_____
Coordination with Driver	_____
Coordination with Other Tank Commanders	=====
Coordination with TOC	_____
Retrieving and Reviewing TOC Overlays	_____
Operational Usage of CVCC	_____
Other (Please Specify)	
_____	_____
_____	_____
_____	_____

2. Rate how difficult you believe it would be to learn each of the skills listed below. In making these ratings, consider the time it would take an incumbent to learn to perform the task satisfactorily. The more time required, the higher the level of learning difficulty.

### LEARNING DIFFICULTY



## SKILLS AND KNOWLEDGES

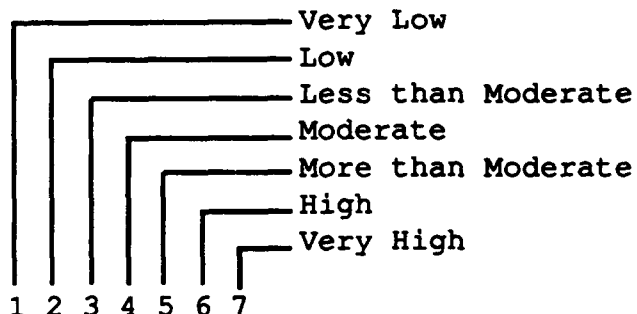
Operating SIMNET - Unique Controls & Displays (Other than CITV and CCD)	_____
CITV Manual Search	_____

**SKILLS AND KNOWLEDGES (Cont.)**

CITV Auto Scan	_____
CITV Target Designate	_____
Operating in GPS Mode	_____
Operating CCD Input Devices	_____
Operating CCD Map Functions	_____
Operating CCD Navigate Functions	_____
Aggregation of CCD Map Icons	_____
Composing Reports	_____
Retrieving and Reviewing Reports	_____
Sending Reports	_____
Coordination with Gunner	_____
Coordination with Driver	_____
Coordination with Other Tank Commanders	_____
Coordination with TOC	_____
Retrieving and Reviewing TOC Overlays	_____
Operational Usage of CVCC	_____
Other (Please Specify)	
_____	_____
_____	_____
_____	_____

3. In developing training exercises for a new system such as the TOC Workstation, describe what tasks should be emphasized using the following rating scale.

#### TRAINING EMPHASIS



Prepare and Send SPOT Report	_____
Prepare and Send SHELL Report	_____
Prepare and Send CONTACT Report	_____
Prepare and Send CFF Report	_____
Prepare and Send SITREP Report	_____
Direct Actions of Gunner (including fire commands)	_____
Determine Location	_____
Direct a Scheme of Maneuver (e.g., bypass)	_____
Monitor/Correct Route Progress	_____
Monitor/Correct Platoon Positions with Company	_____
Coordinate Sector Searches	_____
Revise/Update Tactical Plan	_____

4 April 1991

**GUNNER AND DRIVER**

YOUR DUTY POSITION:                      Gunner                      Driver                      (circle one)  
 DATE: \_\_\_\_\_ ROSTER NO: \_\_\_\_\_

**TRAINING EVALUATION QUESTIONNAIRE****PART 1: Evaluation of Test Training Program**

We are interested in your views about the training you received this week on the TOC workstations. The questions listed below will ask to rate various components of the training program. Please make your ratings using the following five-point scale.

1	2	3	4	5
Poor	Fair	Average	Good	Excellent

**Training Evaluation**

1. How adequate were the following training events in preparing you to successfully perform your assigned tasks during the test scenarios?

1	2	3	4	5
Poor	Fair	Average	Good	Excellent

- |     |   |       |
|-----|---|-------|
| 1a. | General Introduction                    | _____ |
| 1b. | Gunner/Driver Simulator Orientation     | _____ |
| 1c. | Tank Crew Exercises                     | _____ |
| 1d. | Company Situational Training Exercises  | _____ |
| 1e. | Bn Staff Situational Training Exercises | _____ |
| 1f. | Bn Situational Training Exercises       | _____ |

Explain reasons for any "Poor" or "Fair" ratings, listed above:  
(List Question # beside response.)

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#### TRAINING EVALUATION

2. Were there any CVCC-related functions that you did not use during the test scenarios and exercises due to lack of effective training? YES\_\_\_\_\_ NO\_\_\_\_\_

If YES, which ones?

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3. Rate how well you were trained to perform the tasks required in the test scenario using the following scale.

1	2	3	4	5
Poor	Fair	Average	Good	Excellent

Explain reasons for "Poor" rating:

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4. Did the instruction provide enough information about the operational concepts underlying the CVCC?

YES\_\_\_\_\_ NO\_\_\_\_\_

Explain reasons for no answer:

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#### TRAINING EVALUATION

5. Are there any parts of the training program you think should be eliminated or de-emphasized? YES\_\_\_\_\_ NO\_\_\_\_\_

Explain reasons for yes answer:

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6. Do you have any suggestions on how to improve the test training program?

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Additional Comments:

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4 April 1991

**TOC**

YOUR DUTY POSITION: S2 XO INTELL NCO OPS NCO (circle one)  
 DATE: \_\_\_\_\_ ROSTER NO: \_\_\_\_\_

**TRAINING EVALUATION QUESTIONNAIRE****PART 1: Evaluation of Test Training Program**

We are interested in your views about the training you received this week on the TOC workstations. The questions listed below will ask to rate various components of the training program. Please make your ratings using the following five-point scale.

1	2	3	4	5
Poor	Fair	Average	Good	Excellent

1. How adequate were the components of the training program in preparing you to operate the Message Display and the Map Display?

**CLASSROOM TRAINING:****Message****Map**

1a. Classroom Sessions - Overall

\_\_\_\_\_

\_\_\_\_\_

1b. Instructor's Presentation

\_\_\_\_\_

\_\_\_\_\_

1c. Viewgraphs

\_\_\_\_\_

\_\_\_\_\_

1d. Handouts

\_\_\_\_\_

\_\_\_\_\_

1e. Examples of Tactical Equipment Use

\_\_\_\_\_

\_\_\_\_\_

**HANDS-ON SIMULATOR TRAINING:**

1f. Hands-On - Overall

\_\_\_\_\_

\_\_\_\_\_

1g. RA Explanations

\_\_\_\_\_

\_\_\_\_\_

1h. Hands-On Training

\_\_\_\_\_

\_\_\_\_\_

Explain reasons for "Poor" or "Fair" ratings, if any: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Training Evaluation

2. How adequate were the tactical training exercises in preparing you to use the TOC Workstations in a tactical situation?

1	2	3	4	5
Poor	Fair	Average	Good	Excellent
2a.	TOC Task Training Exercises			_____
2b.	Company Situational Training Exercises			_____
2c.	Bn Staff Situational Training Exercises			_____
2d.	Bn Situational Training Exercises			_____
2e.	Training Scenario			_____

3. How adequate were the following general training sessions?

3a.	General Introduction to TOC Evaluation	_____
3b.	CCD/TOC Demonstration	_____
3c.	Workload Orientation	_____
3d.	TOC Training Review/Free Play	_____

Explain reasons for any "Poor" or "Fair" ratings, listed above:  
(List Question # beside response.)

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### TRAINING EVALUATION

4. Were there any TOC Workstation functions that you did not use during the test scenarios and exercises due to lack of effective training? YES\_\_\_\_\_ NO\_\_\_\_\_

If YES, which ones?

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5. Rate how well you were trained to perform the tasks required in the test scenario using the following scale.

1	2	3	4	5
Poor	Fair	Average	Good	Excellent

Explain reasons for "Poor" rating:

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6. Did the classroom instruction provide enough information about the operational concepts underlying the new workstation?  
YES\_\_\_\_\_ NO\_\_\_\_\_

Explain reasons for no answer:

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## TRAINING EVALUATION

7. Are there any parts of the training program you think should be eliminated or de-emphasized? YES\_\_\_\_\_ NO\_\_\_\_\_

Explain reasons for yes answer:

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8. Do you have any suggestions on how to improve the test training program?

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Additional Comments:

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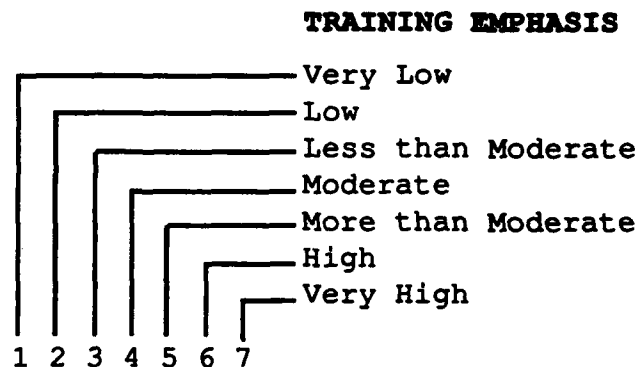
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## PART 2: Future Training Requirements

The answers you provide in this section will help the Army determine training requirements for new systems similar to the one you have worked with this week.

1. If the Army were to implement a system like the TOC Workstations, how much emphasis should be placed in training each of the skills, knowledges and tasks listed below. In making your ratings, use the following scale.



### SKILLS AND KNOWLEDGES

Basic Computer Skills (e.g., use of mouse)	_____
Creation of Overlays	_____
Editing of Overlays	_____
Sending Overlays	_____
Aggregating/Disaggregating Friendly Icons	_____
Manipulating Message Icons	_____
Composing Reports	_____
Reviewing Reports from Vehicles	_____
Organizing Reports	_____
Coordination with Bn Cdr and S3	_____
Coordination Among TOC Staff	_____
Coordination with Tank Commanders	_____

## SKILLS AND KNOWLEDGES (Cont.)

Operational Usage of TOC Workstations \_\_\_\_\_

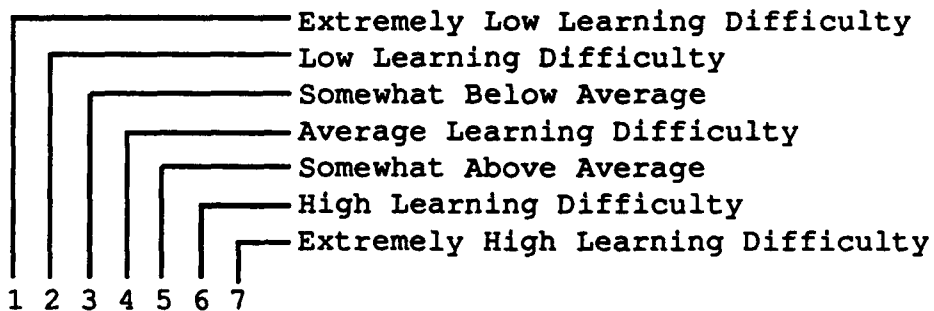
Potential TOC Workstation Operational Procedures \_\_\_\_\_

Other (Please Specify)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Rate how difficult you believe it would be to learn each of the skills listed below. In making these ratings, consider the time it would take an incumbent to learn to perform the task satisfactorily. The more time required, the higher the level of learning difficulty.

### LEARNING DIFFICULTY



## SKILLS AND KNOWLEDGES

Basic Computer Skills (e.g., use of mouse) \_\_\_\_\_

Creation of Overlays \_\_\_\_\_

Editing of Overlays \_\_\_\_\_

Sending Overlays \_\_\_\_\_

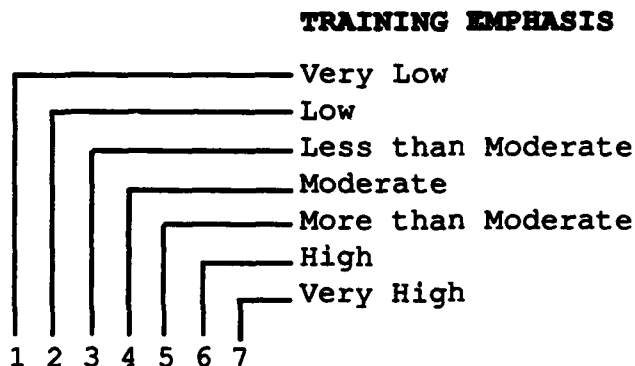
Aggregating/Disaggregating Friendly Icons \_\_\_\_\_

Manipulating Message Icons \_\_\_\_\_

Composing Reports \_\_\_\_\_

Reviewing Reports from Vehicles	_____
Organizing Reports	_____
Coordination with Bn Cdr and S3	_____
Coordination with Other TOC Personnel	_____
Coordination with Tank Commanders	_____
Operational Usage of TOC Workstations	_____
Potential TOC Workstation Operational Procedures	_____
Other (Please Specify)	
_____	_____
_____	_____
_____	_____

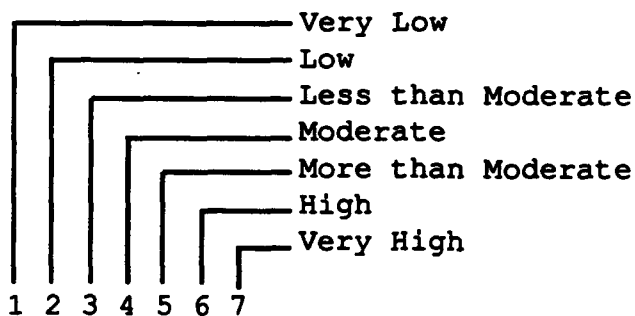
3. In developing training exercises for a new system such as the TOC Workstation, describe what tasks should be emphasized using the following rating scale.



Maintain Section Journal and Journal File	_____
Prepare and Maintain Situation Map and Associated Overlays	_____
Extract, Categorize, and File Information from Incoming Messages	_____
Determine Threat Probable Course of Action (S2, Intel NCO)	_____

Prepare an Overlay	_____
Disseminate Information to Battalion	_____
Monitor Battle and Decide on Need for Action or Change	_____
Prepare Battalion Frago	_____
Identify and Assess Alternative Friendly Course of Action (XO, OPS NCO)	_____
Evaluate Incoming Information in Terms of Pertinence, Accuracy, and Reliability	_____
Monitor Maintenance of the Section Journal (S2, XO)	_____
Monitor Maintenance of the Situation Map and Preparation of the Situation Overlay (S2, XO)	_____
Supervise the Threat Evaluation Effort (S2, XO)	_____
Supervise Dissemination of Information (S2, XO)	_____
Present Situation Update (S2, XO, OPS NCO, Intell NCO) to Bn Cdr.	_____

#### TRAINING EMPHASIS



## Appendix B

### Task Analysis Data

Task	Page
Prepare an Operational Overlay . . . . .	B-3
Prepare Battalion FRAGO . . . . .	B-5
Update Friendly Information on Situation Display . . . . .	B-7
Maintain Operations Journal . . . . .	B-9
Monitor Battle and Decide on Need for Action or Change (S3) . . . . .	B-11
Analyze and Assess Alternative Friendly Courses of Action (S3) . . . . .	B-13
Prepare an Intelligence Overlay . . . . .	B-14
Disseminate Overlay to Battalion . . . . .	B-16
Update Threat Information on Situation Display . . . . .	B-17
Monitor Battle and Decide on Need for Action or Change (S2) . . . . .	B-19
Analyze and Assess Alternative Threat Courses of Action (S2) . . . . .	B-20
Monitor and Process Voice Messages . . . . .	B-21

## **TOC TASK AND TASK ELEMENT DATA FORM**

### **1 Prepare an Operational Overlay**

#### **DUTY POSITION**

Executive Officer  
Operations NCO

#### **CONDITIONS**

Tactical or non-tactical situation under all weather conditions  
All types of terrain  
May be performed in an NBC environment  
Battalion Tactical Operations Center Shelter

#### **INITIATING CUES**

Receive operations order  
Receive FRAGO

#### **TERMINATING CUES**

Overlay is accepted by the commander

#### **FEEDBACK CUES**

Commander provides feedback during reviews of the overlay

#### **COMMENTS**

None

#### **SKILLS**

Manipulate cursor with mouse  
Use keyboard

#### **KNOWLEDGE**

Graphical control measures  
Unit tactics and operations  
Menu functions  
Icon manipulation  
Drawing capabilities

#### **1.01 Call up Build and Edit Overlays Screen**

#### **DISPLAYS**

TOC S3 workstation - Map Display

#### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor

## **1.02 Create Overlay**

### **DISPLAYS**

TOC S3 workstation - Map Display

### **CONTROLS**

Workstation keyboard

Workstation mouse

Cursor

## **1.03 Save Overlay**

### **DISPLAYS**

TOC S3 workstation - Map Display

### **CONTROLS**

Workstation keyboard

Workstation mouse

Cursor

## **2 Prepare Battalion FRAGO**

### **DUTY POSITION**

Executive Officer  
Operations NCO

### **CONDITIONS**

Tactical or non-tactical situation under all weather conditions  
All types of terrain  
May be performed in an NBC environment  
Battalion Tactical Operations Center Shelter

### **INITIATING CUES**

Commander has reviewed FRAGO  
Next mission is going to be started

### **TERMINATING CUES**

Overlay is received by deployed stations

### **FEEDBACK CUES**

Receiving stations acknowledge receiving the overlay

### **COMMENTS**

None

### **SKILLS**

Manipulate cursor with mouse

### **KNOWLEDGE**

Unit tactics and operations  
Menu functions

## **2.01 Call up Send Overlay Screen**

### **DISPLAYS**

TOC S3 workstation - Map Display

### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor

## **2.02 Select and Send Overlay**

### **DISPLAYS**

TOC S3 workstation - Map Display

### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor

## **2.03 Prepare and Send a Free Text Message**

### **DISPLAYS**

TOC S3 workstation - Communication and Planning Display

### **CONTROLS**

Workstation keyboard

Workstation mouse

Cursor

### **3 Update Friendly Information on Situation Display**

#### **DUTY POSITION**

Executive Officer  
Operations NCO

#### **CONDITIONS**

Tactical or non-tactical situation under all weather conditions  
All types of terrain  
May be performed in an NBC environment  
Battalion Tactical Operations Center Shelter

#### **INITIATING CUES**

The situation displayed on the Situation Display is outdated  
Commander or XO asks for an update  
The situation changes enough to warrant updating the Situation Display

#### **TERMINATING CUES**

Overlay is posted to the Situation Display

#### **FEEDBACK CUES**

Overlay is posted on the Situation Display

#### **COMMENTS**

None

#### **SKILLS**

Manipulate cursor with mouse  
Use keyboard

#### **KNOWLEDGE**

Graphical control measures  
Unit tactics and operations  
Menu functions  
Icon manipulation  
Drawing capabilities

### **3.01 Call up Build and Edit Overlays Screen**

#### **DISPLAYS**

TOC S3 workstation - Map Display

#### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor

### **3.02 Edit Overlay**

#### **DISPLAYS**

TOC S3 workstation - Map Display

#### **CONTROLS**

Workstation keyboard

Workstation mouse

Cursor

### **3.03 Save Overlay**

#### **DISPLAYS**

TOC S3 workstation - Map Display

#### **CONTROLS**

Workstation keyboard

Workstation mouse

Cursor

### **3.04 Post Overlay to Situation Display**

#### **DISPLAYS**

TOC S3 workstation - Map Display

#### **CONTROLS**

Workstation keyboard

Workstation mouse

Cursor

## **4 Maintain Operations Journal**

### **DUTY POSITION**

Executive Officer  
Operations NCO

### **CONDITIONS**

Tactical or non-tactical situation under all weather conditions  
All types of terrain  
May be performed in an NBC environment  
Battalion Tactical Operations Center Shelter

### **INITIATING CUES**

Messages are received by the battalion TOC workstation

### **TERMINATING CUES**

Message reviewed  
Message deleted  
Message posted to desired journal/folder

### **FEEDBACK CUES**

None

### **COMMENTS**

None

### **SKILLS**

Manipulate cursor with mouse  
Use keyboard

### **KNOWLEDGE**

Icon association  
Infolder functionality  
Report contents and importance  
Tactical operational

## **4.01 Display Messages from Infolder**

### **DISPLAYS**

TOC S3 workstation - Communication and Planning Display

### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor

#### **4.02 Post Message to Desired Journal/Folder**

##### **DISPLAYS**

TOC S3 workstation - Communication and Planning Display

##### **CONTROLS**

Workstation keyboard

Workstation mouse

Cursor

## **5 Monitor Battle and Decide on Need for Action or Change (S3)**

### **DUTY POSITION**

Executive Officer  
Operations NCO

### **CONDITIONS**

Tactical or non-tactical situation under all weather conditions  
All types of terrain  
May be performed in an NBC environment  
Battalion Tactical Operations Center Shelter

### **INITIATING CUES**

Tactical situation changes

### **TERMINATING CUES**

Orders are received for change in situation

### **FEEDBACK CUES**

Receiving stations acknowledge receipt of orders

### **COMMENTS**

None

### **SKILLS**

Manipulate cursor with mouse  
Use keyboard

### **KNOWLEDGE**

Icon association  
Unit tactics and operations  
Report contents and importance

## **5.01 Monitor Current Tactical Situation**

### **DISPLAYS**

TOC S3 workstation - Map & Communication and Planning Display

### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor

## **5.02 Send Verbal Order**

### **DISPLAYS**

TOC S3 workstation - Communication and Planning Display

### **CONTROLS**

Workstation keyboard

Workstation mouse

Cursor

SINGARS Radio

## **6 Analyze and Assess Alternative Friendly Courses of Action (S3)**

### **DUTY POSITION**

Executive Officer  
Operations NCO

### **CONDITIONS**

Tactical or non-tactical situation under all weather conditions  
All types of terrain  
May be performed in an NBC environment  
Battalion Tactical Operations Center Shelter

### **INITIATING CUES**

Commander has provided command guidance  
An Operations Estimate has been conducted

### **TERMINATING CUES**

The commander decides on course of action

### **FEEDBACK CUES**

Commander provides responses and feedback on course of action

### **COMMENTS**

None

### **SKILLS**

Manipulate cursor with mouse  
Use keyboard

### **KNOWLEDGE**

Icon association  
Unit tactics and operations  
Menu functionality

## **6.01 Post and Unpost Overlays to Map Display**

### **DISPLAYS**

TOC S3 workstation - Map Display

### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor

## **7 Prepare an Intelligence Overlay**

### **DUTY POSITION**

S2 - Intelligence Officer  
Intelligence NCO

### **CONDITIONS**

Tactical or non-tactical situation under all weather conditions  
All types of terrain  
May be performed in an NBC environment  
Battalion Tactical Operations Center Shelter

### **INITIATING CUES**

Receive operations order  
Receive FRAGO

### **TERMINATING CUES**

Overlay is sent out to deployed stations

### **FEEDBACK CUES**

None

### **COMMENTS**

None

### **SKILLS**

Manipulate cursor with mouse  
Use keyboard

### **KNOWLEDGE**

Graphical control measures  
Threat tactics and operations  
Menu functions  
Icon manipulation  
Drawing capabilities

## **7.01 Call up Build and Edit Overlays Screen**

### **DISPLAYS**

TOC S2 workstation - Map Display

### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor

## **7.02 Create Overlay**

### **DISPLAYS**

TOC S2 workstation - Map Display

### **CONTROLS**

Workstation keyboard

Workstation mouse

Cursor

## **7.03 Save Overlay**

### **DISPLAYS**

TOC S2 workstation - Map Display

### **CONTROLS**

Workstation keyboard

Workstation mouse

Cursor

## **8 Disseminate Overlay to Battalion**

### **DUTY POSITION**

S2 - Intelligence Officer  
Intelligence NCO

### **CONDITIONS**

Tactical or non-tactical situation under all weather conditions  
All types of terrain  
May be performed in an NBC environment  
Battalion Tactical Operations Center Shelter

### **INITIATING CUES**

Commander has reviewed FRAGO  
Next mission is going to be started  
Threat situation changes or continues to develop

### **TERMINATING CUES**

Overlay is received by deployed stations

### **FEEDBACK CUES**

Receiving stations acknowledge receiving the overlay

### **COMMENTS**

None

### **SKILLS**

Manipulate cursor with mouse

### **KNOWLEDGE**

Threat tactics and operations  
Menu functions

## **8.01 Call up Send Overlay Screen**

### **DISPLAYS**

TOC S2 workstation - Map Display

### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor

## **8.02 Select and Send Overlay**

### **DISPLAYS**

TOC S2 workstation - Map Display

### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor

## **9 Update Threat Information on Situation Display**

### **DUTY POSITION**

S2 - Intelligence Officer  
Intelligence NCO

### **CONDITIONS**

Tactical or non-tactical situation under all weather conditions  
All types of terrain  
May be performed in an NBC environment  
Battalion Tactical Operations Center Shelter

### **INITIATING CUES**

The situation displayed on the Situation Display is outdated  
Commander or XO asks for an update  
The situation changes enough to warrant updating the Situation Display

### **TERMINATING CUES**

Overlay is posted to the Situation Display

### **FEEDBACK CUES**

Overlay is posted on the Situation Display

### **COMMENTS**

None

### **SKILLS**

Manipulate cursor with mouse  
Use keyboard

### **KNOWLEDGE**

Graphical control measures  
Unit tactics and operations  
Menu functions  
Icon manipulation  
Drawing capabilities

## **9.01 Call up Build and Edit Overlays Screen**

### **DISPLAYS**

TOC S2 workstation - Map Display

### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor

## **9.02 Edit Overlay**

### **DISPLAYS**

TOC S2 workstation - Map Display

### **CONTROLS**

Workstation keyboard

Workstation mouse

Cursor

## **9.03 Save Overlay**

### **DISPLAYS**

TOC S2 workstation - Map Display

### **CONTROLS**

Workstation keyboard

Workstation mouse

Cursor

## **9.04 Post Overlay to Situation Display**

### **DISPLAYS**

TOC S2 workstation - Map Display

### **CONTROLS**

Workstation keyboard

Workstation mouse

Cursor

## **10 Monitor Battle and Decide on Need for Action or Change (S2)**

### **DUTY POSITION**

S2 - Intelligence Officer  
Intelligence NCO

### **CONDITIONS**

Tactical or non-tactical situation under all weather conditions  
All types of terrain  
May be performed in an NBC environment  
Battalion Tactical Operations Center Shelter

### **INITIATING CUES**

Tactical situation changes

### **TERMINATING CUES**

Orders are received for change in situation

### **FEEDBACK CUES**

Receiving stations acknowledge receipt of orders

### **COMMENTS**

None

### **SKILLS**

Manipulate cursor with mouse  
Use keyboard

### **KNOWLEDGE**

Icon association  
Threat tactics and operations  
Report contents and importance

## **10.01 Monitor Current Tactical Situation**

### **DISPLAYS**

TOC S2 workstation - Map & Communication and Planning Display

### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor

## **10.02 Send Report/Update Order**

### **DISPLAYS**

TOC S2 workstation - Communication and Planning Display

### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor  
SINCGARS Radio

## **11 Analyze and Assess Alternative Threat Courses of Action (S2)**

### **DUTY POSITION**

S2 - Intelligence Officer  
Intelligence NCO

### **CONDITIONS**

Tactical or non-tactical situation under all weather conditions  
All types of terrain  
May be performed in an NBC environment  
Battalion Tactical Operations Center Shelter

### **INITIATING CUES**

Commander has provided command guidance  
An Intelligence Estimate has been conducted

### **TERMINATING CUES**

The commander decides on course of action

### **FEEDBACK CUES**

Commander provides responses and feedback on course of action

### **COMMENTS**

None

### **SKILLS**

Manipulate cursor with mouse  
Use keyboard

### **KNOWLEDGE**

Icon association  
Threat tactics and operations  
Menu functionality

## **11.01 Post and Unpost Overlays to Map Display**

### **DISPLAYS**

TOC S2 workstation - Map Display

### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor

## **12 Monitor and Process Voice Messages**

### **DUTY POSITION**

S2 - Intelligence Officer  
Intelligence NCO

### **CONDITIONS**

Tactical or non-tactical situation under all weather conditions  
All types of terrain  
May be performed in an NBC environment  
Battalion Tactical Operations Center Shelter

### **INITIATING CUES**

Voice communication is received  
Voice communication needs to be entered into the TOC system

### **TERMINATING CUES**

The voice communication is transferred to digital message and filed

### **FEEDBACK CUES**

None

### **COMMENTS**

None

### **SKILLS**

Manipulate cursor with mouse  
Use keyboard

### **KNOWLEDGE**

Icon association  
Threat tactics and operations  
Menu functionality  
Report contents and importance

## **12.01 Receive and Transmit Messages on the SINCGARS**

### **DISPLAYS**

TOC S2 workstation - Map & Communication and Planning Display

### **CONTROLS**

Workstation keyboard  
Workstation mouse  
Cursor  
SINCGARS radio

## **12.02 Prepare, Submit, and File Digital Messages**

### **DISPLAYS**

TOC S2 workstation - Communication and Planning Display

### **CONTROLS**

Workstation keyboard

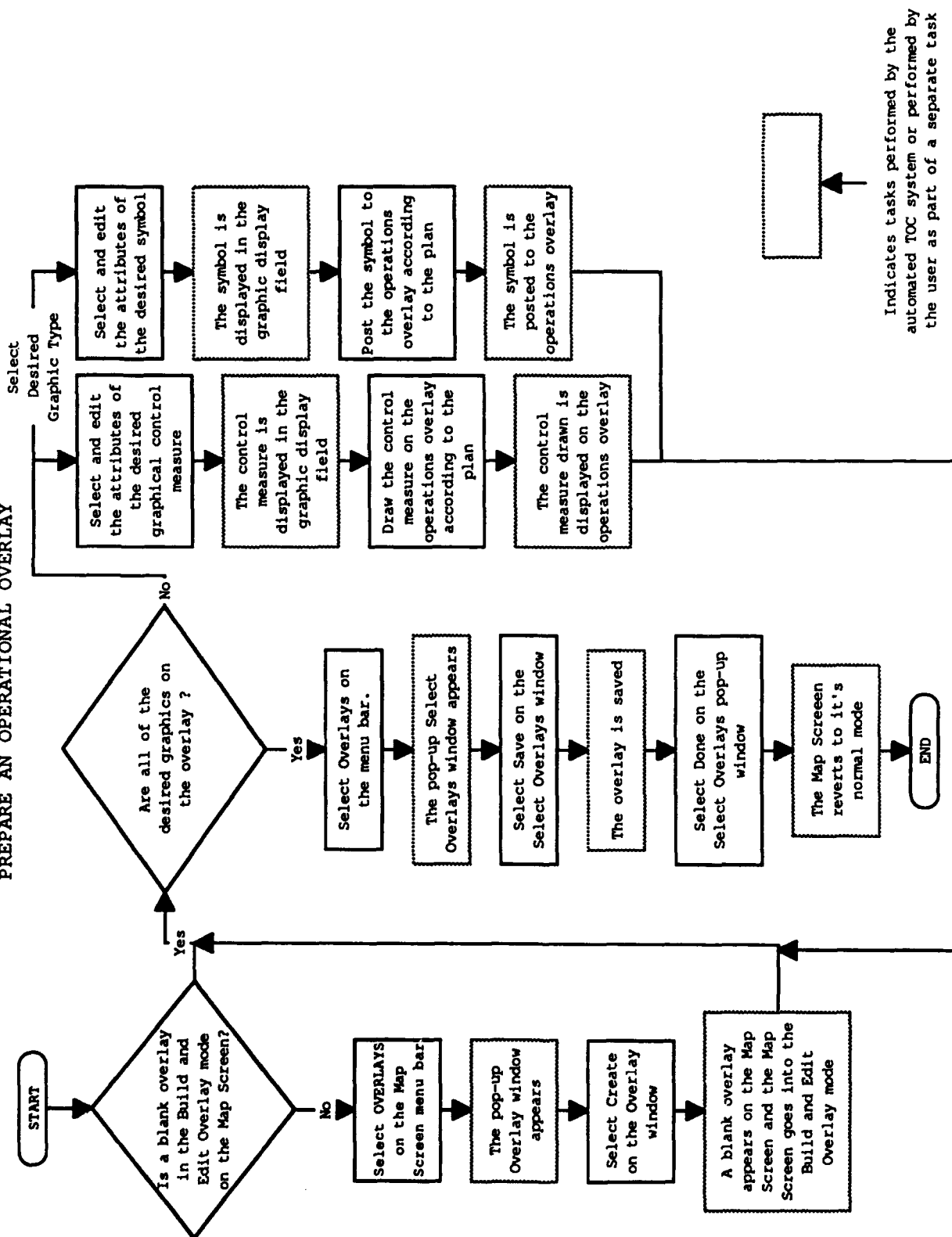
Workstation mouse

Cursor

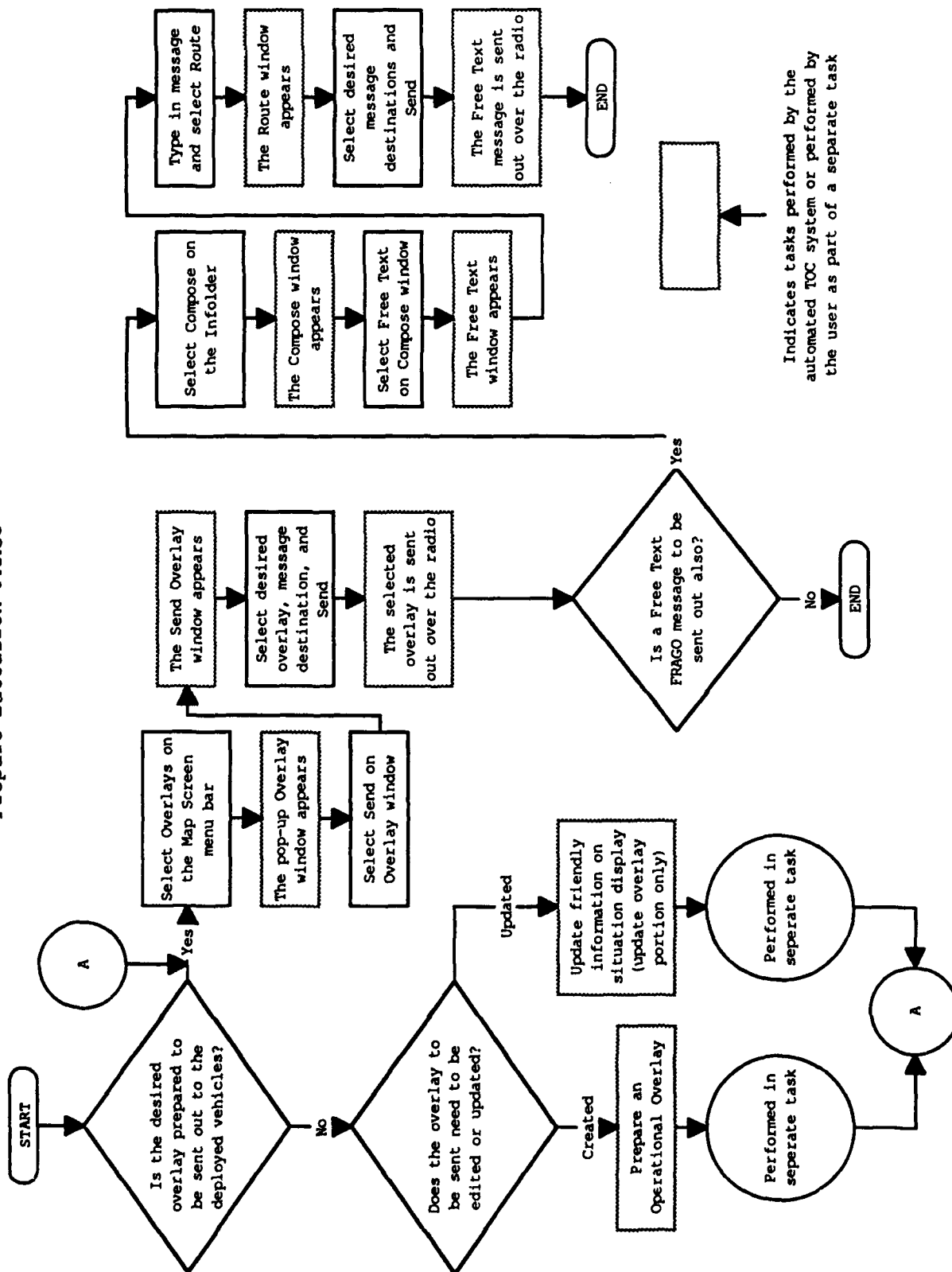
SINGARS radio

Appendix C  
Flow Charts

# PREPARE AN OPERATIONAL OVERLAY

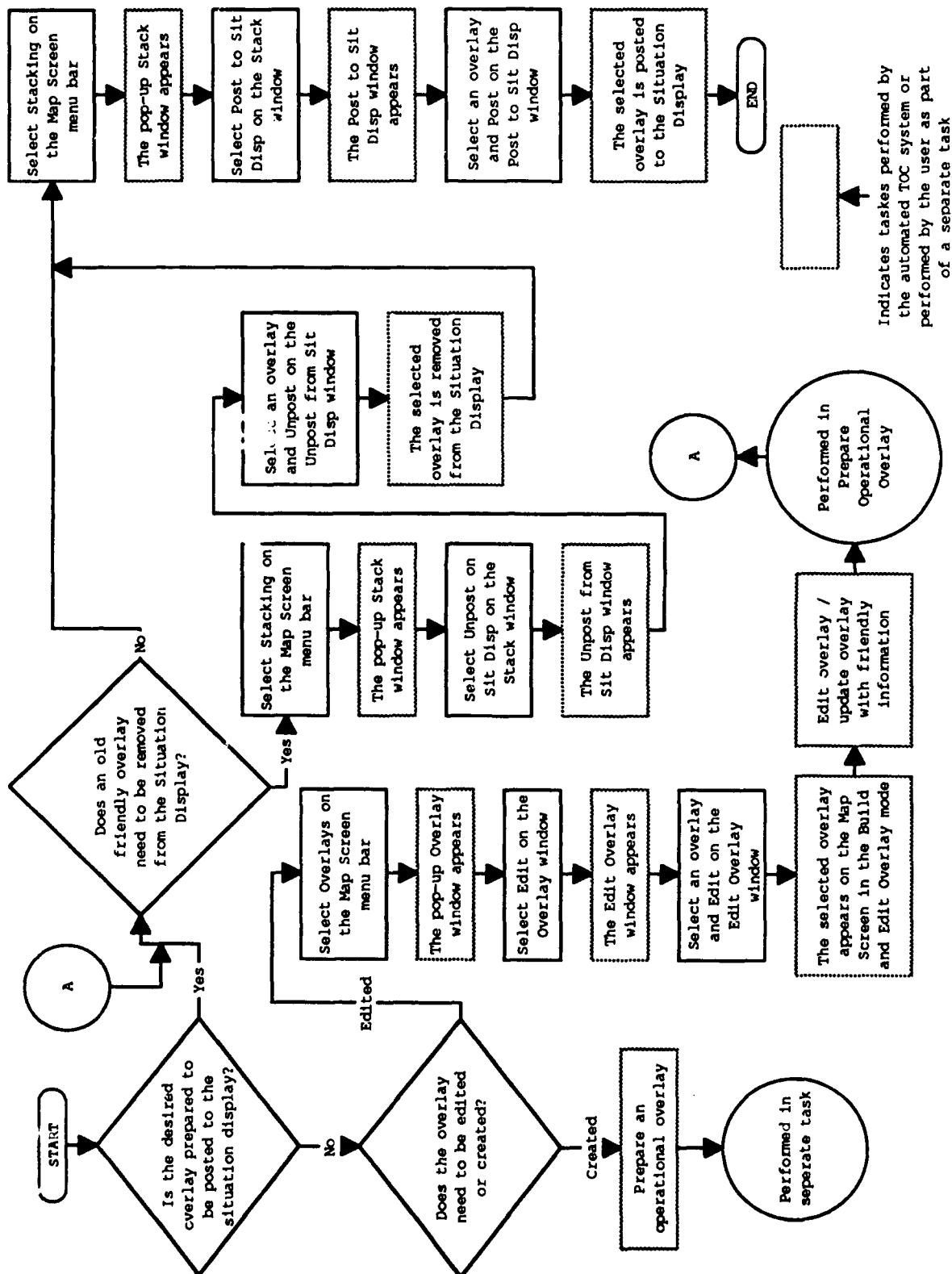


# Prepare Battalion FRAGO

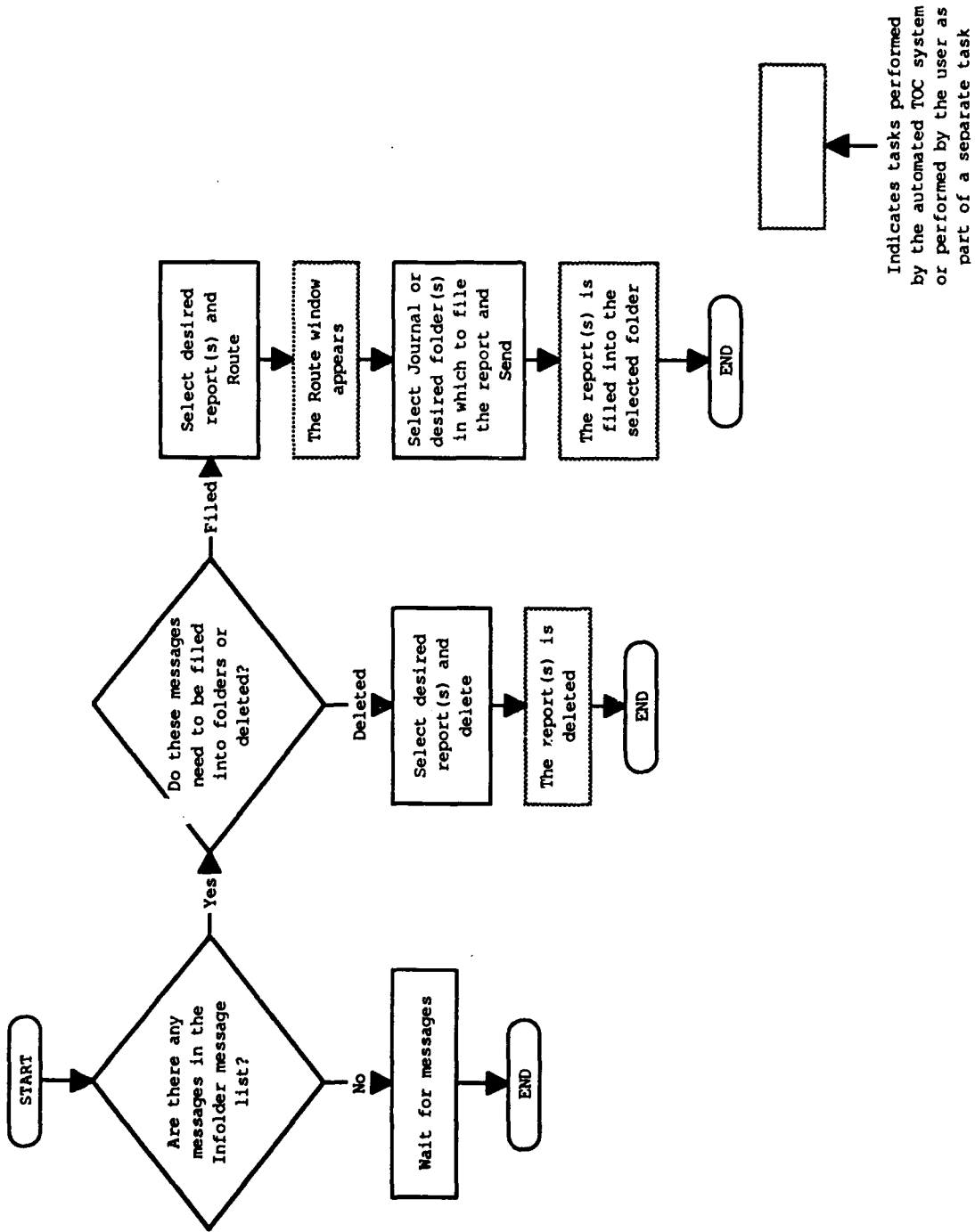


Indicates tasks performed by the automated TOC system or performed by the user as part of a separate task

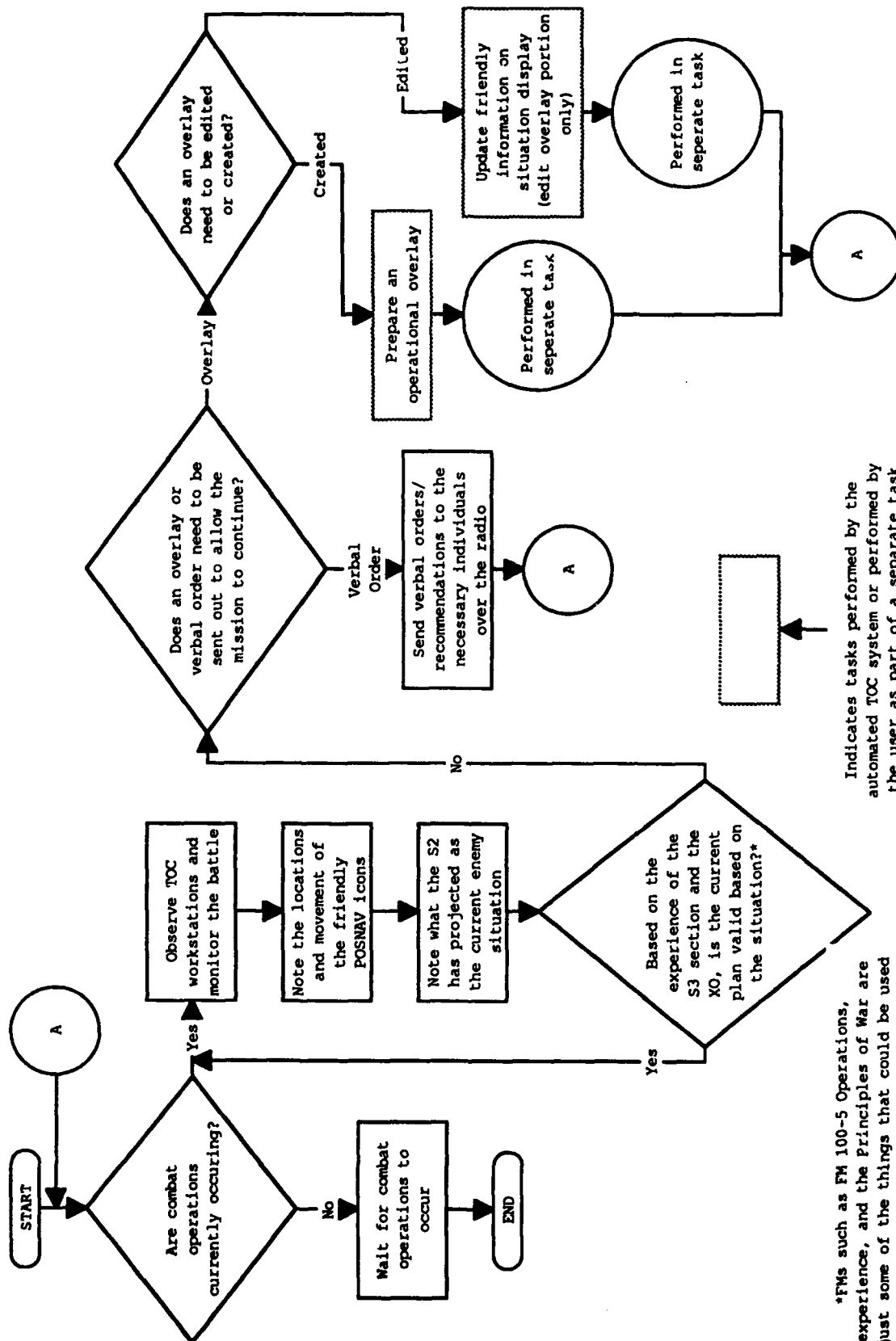
# UPDATE FRIENDLY INFORMATION ON SITUATION DISPLAY



# MAINTAIN OPERATIONS JOURNAL

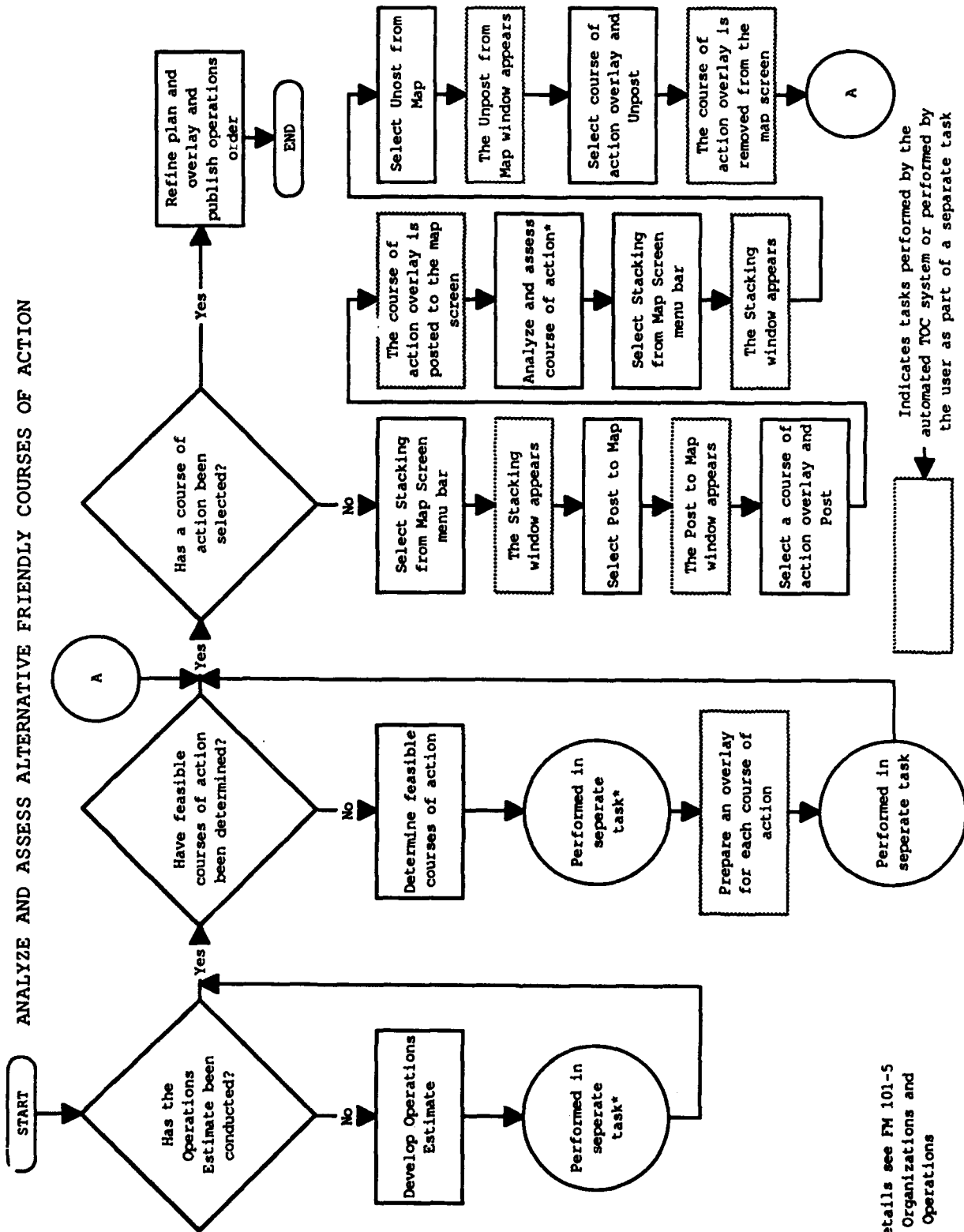


# MONITOR BATTLE AND DECIDE ON NEED FOR ACTION OR CHANGE (S3)



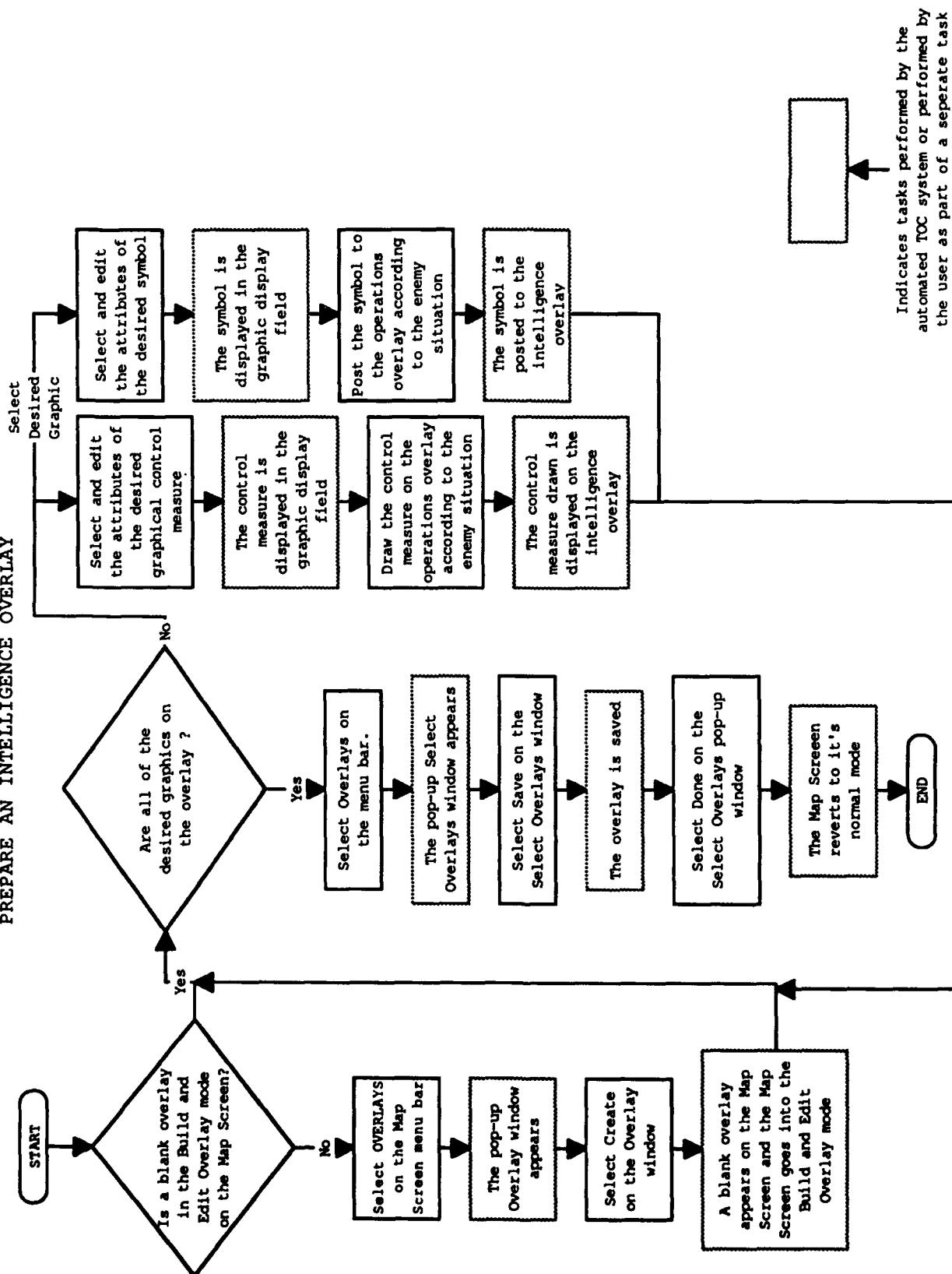
\*FMs such as FM 100-5 Operations, experience, and the Principles of War are just some of the things that could be used to help make this determination.

# ANALYZE AND ASSESS ALTERNATIVE FRIENDLY COURSES OF ACTION

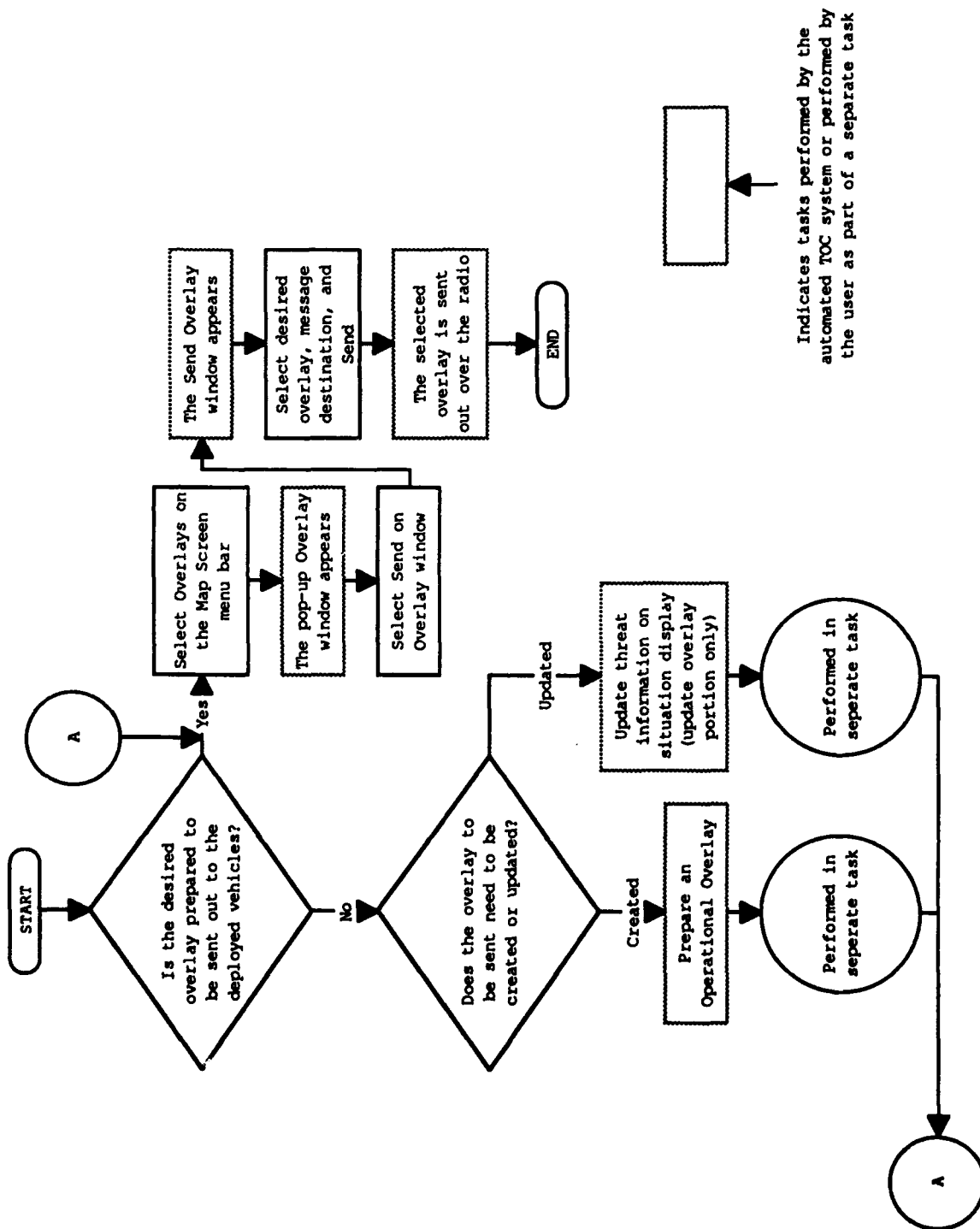


\*For details see FM 101-5 Staff Organizations and Operations

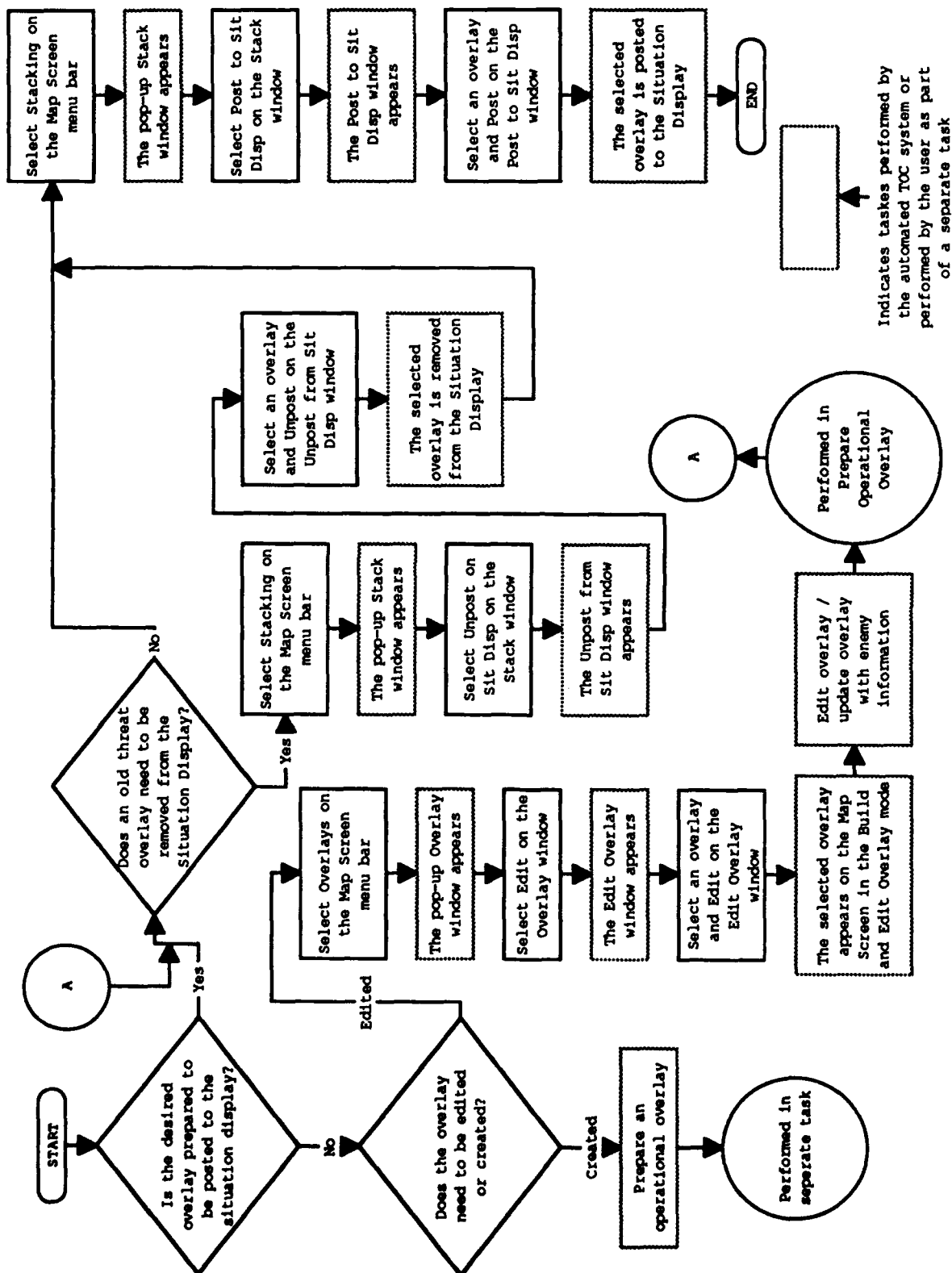
# PREPARE AN INTELLIGENCE OVERLAY



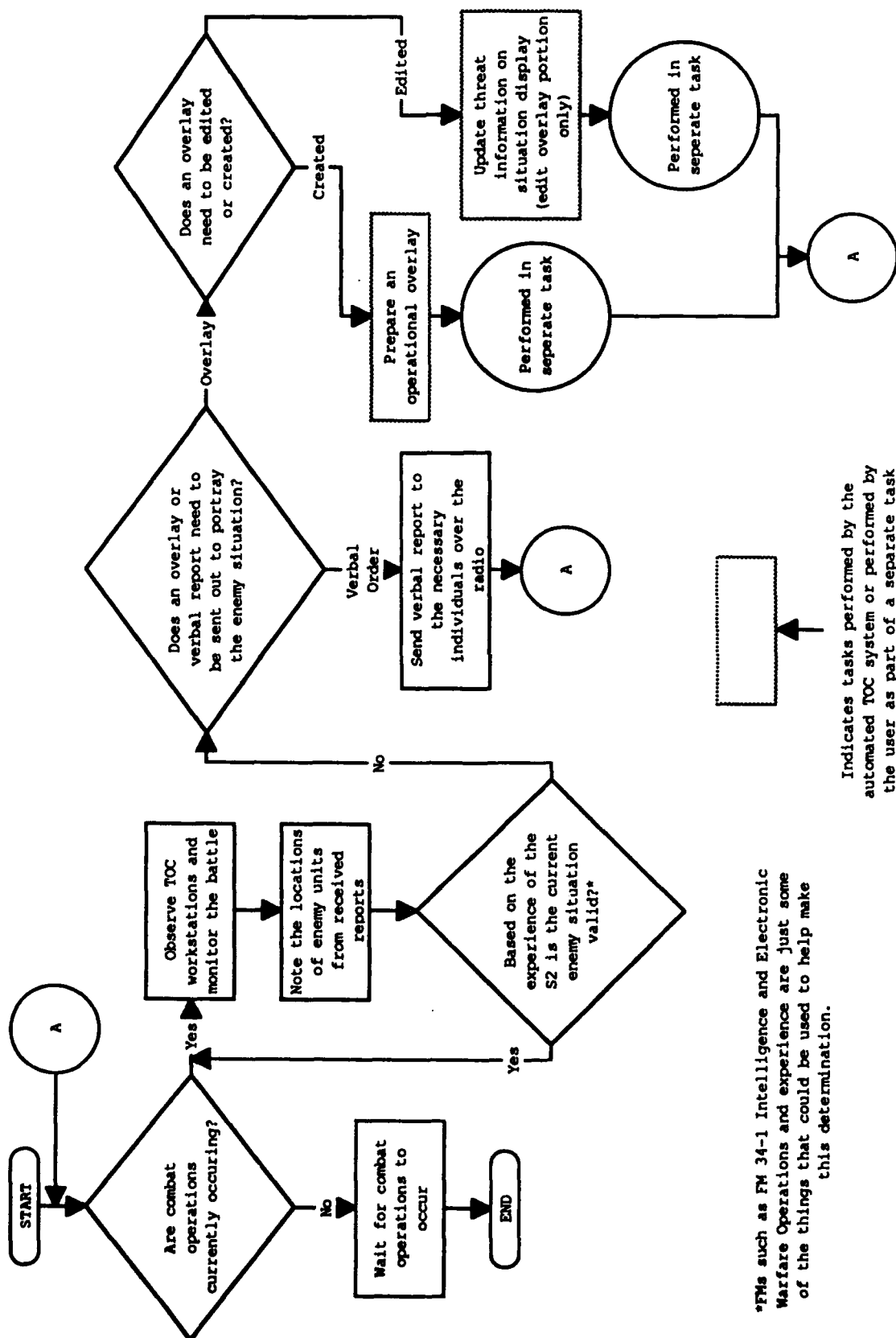
# DISSEMINATE OVERLAY TO BN



# UPDATE THREAT INFORMATION ON SITUATION DISPLAY

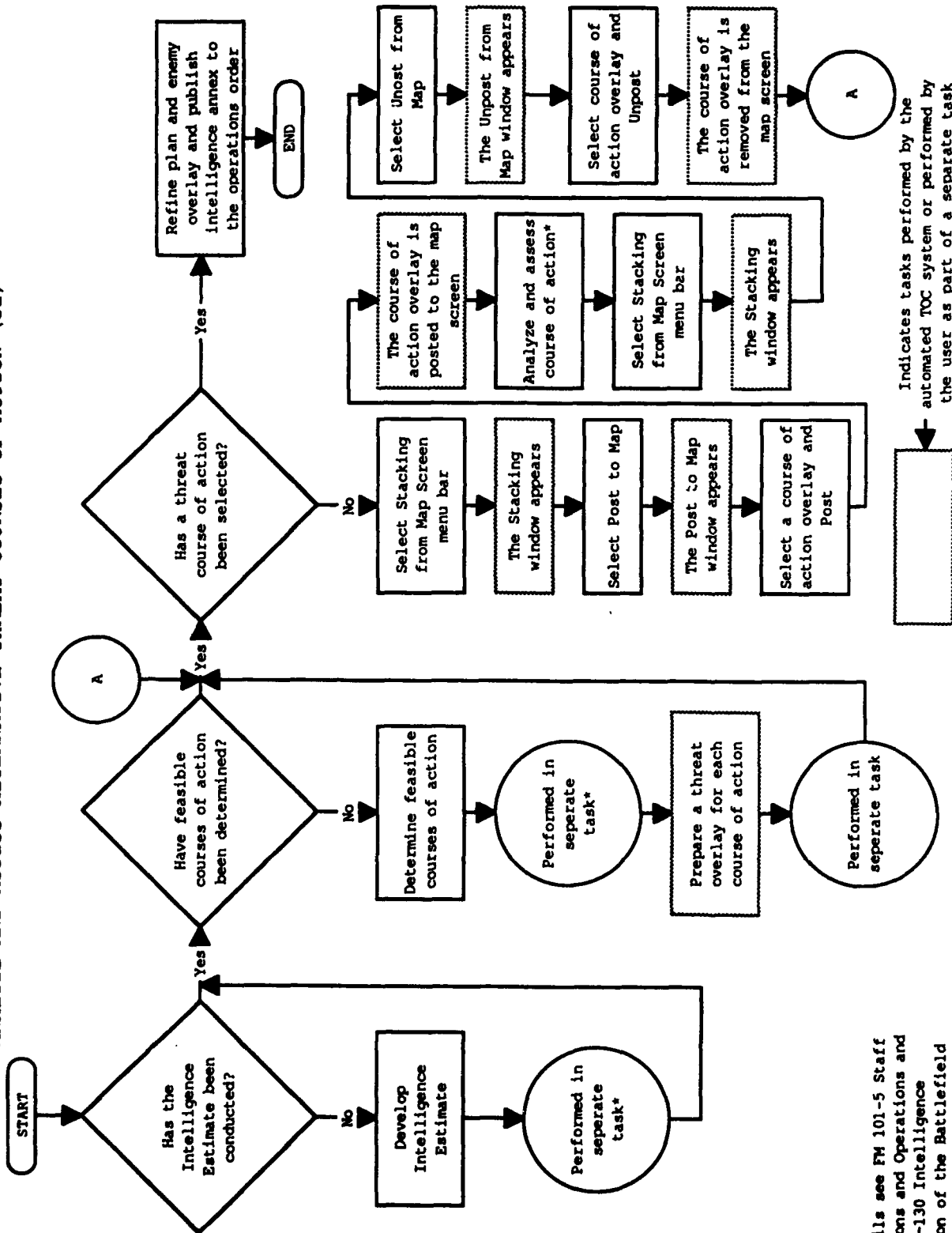


# MONITOR BATTLE AND DECIDE ON NEED FOR ACTION OR CHANGE (S2)



\*PMs such as FM 34-1 Intelligence and Electronic Warfare Operations and experience are just some of the things that could be used to help make this determination.

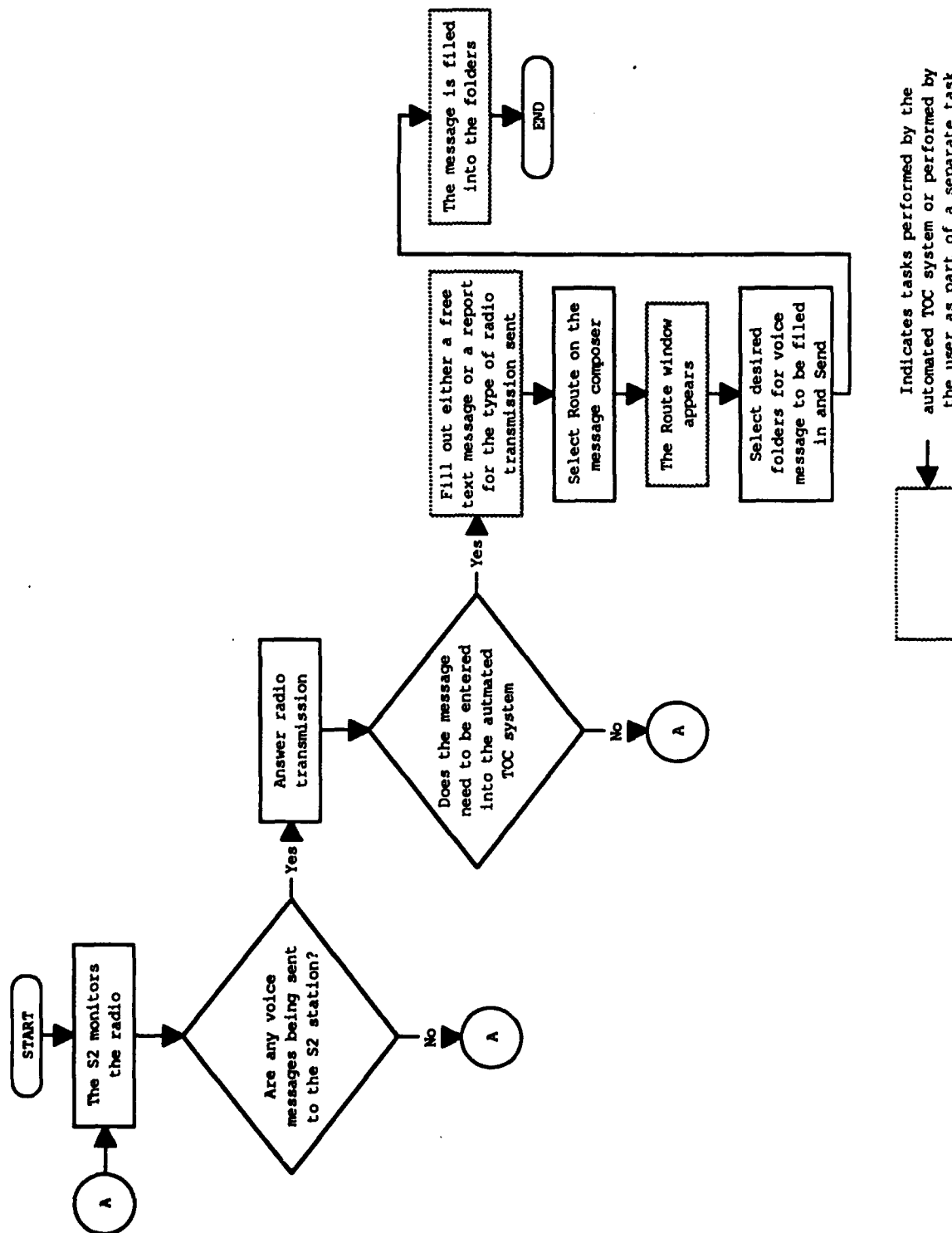
# ANALYZE AND ASSESS ALTERNATIVE THREAT COURSES OF ACTION (S2)



\*For details see FM 101-5 Staff Organizations and Operations and FM 34-130 Intelligence Preparation of the Battlefield

Indicates tasks performed by the automated TOC system or performed by the user as part of a separate task

# MONITOR AND PROCESS VOICE MESSAGES



## Appendix D

### Training Requirements Analysis Data Tables

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Table D-1

## Vehicle Commander's Learning Difficulty Ratings

Vehicle	Operate SIMNET controls	CITV manual search	CITV auto scan	CITV target designate	Operate in GPS mode
Co A					
N	4	4	4	4	4
Mn	3.75	2.75	3.75	3.75	2.75
StD	1.26	.50	.96	1.26	.50
CVa	.34	.18	.26	.34	.18
Min	2.00	2.00	3.00	2.00	2.00
Max	5.00	3.00	5.00	5.00	3.00
Co B					
N	4	4	4	4	4
Mn	1.75	2.50	3.75	2.50	2.75
StD	.96	.58	.50	.58	.96
CVa	.55	.23	.13	.23	.35
Min	1.00	2.00	3.00	2.00	2.00
Max	3.00	3.00	4.00	3.00	4.00
Co C					
N	4	4	4	4	4
Mn	3.50	2.50	3.50	2.50	2.75
StD	1.91	1.00	1.29	1.00	.96
CVa	.55	.40	.37	.40	.35
Min	2.00	2.00	2.00	2.00	2.00
Max	6.00	4.00	5.00	4.00	4.00
Co D					
N	4	4	4	4	4
Mn	3.50	2.75	3.00	3.00	3.00
StD	1.29	.50	.82	.82	.82
CVa	.37	.18	.27	.27	.27
Min	2.00	2.00	2.00	2.00	2.00
Max	5.00	3.00	4.00	4.00	4.00
Battalion Commander					
N	4	4	4	4	4
Mn	2.75	2.75	4.50	3.00	3.75
StD	.96	1.50	1.29	1.15	1.26
CVa	.35	.55	.29	.38	.34
Min	2.00	2.00	3.00	2.00	2.00
Max	4.00	5.00	6.00	4.00	5.00

Table D-1

## Vehicle Commander's Learning Difficulty Ratings (Cont.)

Vehicle	Operate SIMNET controls	CITV manual search	CITV auto scan	CITV target designate	Operate in GPS mode
S3					
N	4	4	4	4	4
Mn	3.50	2.75	4.50	3.50	3.00
StD	.58	.96	1.73	1.29	1.41
CVa	.16	.35	.38	.37	.47
Min	3.00	2.00	2.00	2.00	1.00
Max	4.00	4.00	6.00	5.00	4.00
TOTAL					
N	24	24	24	24	24
Mn	3.12	2.67	3.83	3.04	3.00
StD	1.30	.82	1.17	1.04	.98
CVa	.41	.31	.30	.34	.33
Min	1.00	2.00	2.00	2.00	1.00
Max	6.00	5.00	6.00	5.00	5.00

Table D-1

## Vehicle Commander's Learning Difficulty Ratings (Cont.)

Vehicle	Operate CCD inputs	Operate CCD map functions	Operate CCD navigate functions	Aggregate CCD icons	Compose reports
Co A					
N	4	4	4	4	4
Mn	5.00	5.00	4.75	4.75	5.50
StD	.82	.82	.50	.96	.58
CVa	.16	.16	.11	.20	.10
Min	4.00	4.00	4.00	4.00	5.00
Max	6.00	6.00	5.00	6.00	6.00
Co B					
N	4	4	4	4	4
Mn	4.50	4.25	3.75	3.25	3.75
StD	.58	.50	.96	1.26	.50
CVa	.13	.12	.26	.39	.13
Min	4.00	4.00	3.00	2.00	3.00
Max	5.00	5.00	5.00	5.00	4.00
Co C					
N	4	4	4	4	4
Mn	3.75	3.50	3.75	3.50	3.50
StD	.50	1.00	.50	.58	.58
CVa	.13	.29	.13	.16	.16
Min	3.00	2.00	3.00	3.00	3.00
Max	4.00	4.00	4.00	4.00	4.00
Co D					
N	4	4	4	4	4
Mn	4.75	4.50	3.75	4.00	4.50
StD	.50	.58	.96	.82	1.00
CVa	.11	.13	.26	.20	.22
Min	4.00	4.00	3.00	3.00	3.00
Max	5.00	5.00	5.00	5.00	5.00
Battalion Commander					
N	4	4	4	4	4
Mn	4.25	4.75	4.75	4.25	4.50
StD	1.50	.50	.96	1.71	1.91
CVa	.35	.11	.20	.40	.43
Min	2.00	4.00	4.00	2.00	2.00
Max	5.00	5.00	6.00	6.00	6.00

Table D-1

## Vehicle Commander's Learning Difficulty Ratings (Cont.)

Vehicle	Operate CCD inputs	Operate CCD map functions	Operate CCD navigate functions	Aggregate CCD icons	Compose reports
S3					
N	4	4	4	4	4
Mn	4.50	4.00	4.25	4.75	5.00
StD	1.29	1.15	.96	1.26	.82
CVa	.29	.29	.23	.26	.16
Min	3.00	3.00	3.00	3.00	4.00
Max	6.00	5.00	5.00	6.00	6.00
TOTAL					
N	24	24	24	24	24
Mn	4.46	4.33	4.17	4.08	4.46
StD	.93	.87	.87	1.18	1.14
CVa	.21	.20	.21	.29	.26
Min	2.00	2.00	3.00	2.00	2.00
Max	6.00	6.00	6.00	6.00	6.00

Table D-1

## Vehicle Commander's Learning Difficulty Ratings (Cont.)

Vehicle	Retrieve & review reports	Send reports	Coordinate with gunner	Coordinate with driver	Coordinate with other Veh Cdrs
Co A					
N	4	4	4	4	4
Mn	4.50	4.50	2.75	3.00	3.25
StD	.58	1.00	.50	0.00	.50
CVa	.13	.22	.18	0.00	.15
Min	4.00	3.00	2.00	3.00	3.00
Max	5.00	5.00	3.00	3.00	4.00
Co B					
N	4	4	4	4	4
Mn	3.25	3.00	3.50	3.25	4.50
StD	1.26	1.15	1.29	.96	.58
CVa	.39	.38	.37	.29	.13
Min	2.00	2.00	2.00	2.00	4.00
Max	5.00	4.00	5.00	4.00	5.00
Co C					
N	4	4	4	4	4
Mn	3.75	3.50	3.25	3.00	3.75
StD	.50	.58	.96	.82	1.26
CVa	.13	.16	.29	.27	.34
Min	3.00	3.00	2.00	2.00	2.00
Max	4.00	4.00	4.00	4.00	5.00
Co D					
N	4	4	4	4	4
Mn	5.00	4.25	3.75	3.00	4.25
StD	0.00	.96	.96	.82	1.26
CVa	0.00	.23	.26	.27	.30
Min	5.00	3.00	3.00	2.00	3.00
Max	5.00	5.00	5.00	4.00	6.00
Battalion Commander					
N	4	4	4	4	4
Mn	4.50	4.00	3.25	3.00	3.50
StD	1.91	1.83	1.26	1.41	1.00
CVa	.43	.46	.39	.47	.29
Min	2.00	2.00	2.00	2.00	2.00
Max	6.00	6.00	5.00	5.00	4.00

Table D-1

## Vehicle Commander's Learning Difficulty Ratings (Cont.)

Vehicle	Retrieve & review reports	Send reports	Coordinate with gunner	Coordinate with driver	Coordinate with other Veh Cdrs
S3					
N	4	4	4	4	4
Mn	4.50	3.75	4.50	3.75	4.00
StD	.58	1.89	1.73	2.06	2.45
CVa	.13	.50	.38	.55	.61
Min	4.00	1.00	3.00	1.00	1.00
Max	5.00	5.00	7.00	6.00	7.00
TOTAL					
N	24	24	24	24	24
Mn	4.25	3.83	3.50	3.17	3.88
StD	1.07	1.27	1.18	1.09	1.26
CVa	.25	.33	.34	.34	.33
Min	2.00	1.00	2.00	1.00	1.00
Max	6.00	6.00	7.00	6.00	7.00

Table D-1

## Vehicle Commander's Learning Difficulty Ratings (Cont.)

Vehicle	Coordinate with TOC	Retrieve & review TOC overlays	Operational use of CVCC
Co A			
N	4	4	4
Mn	3.75	4.50	4.50
StD	.96	1.29	1.00
CVa	.26	.29	.22
Min	3.00	3.00	3.00
Max	5.00	6.00	5.00
Co B			
N	4	4	4
Mn	4.00	4.00	4.50
StD	.82	.82	.58
CVa	.20	.20	.13
Min	3.00	3.00	4.00
Max	5.00	5.00	5.00
Co C			
N	4	4	4
Mn	3.75	3.50	4.00
StD	1.26	1.00	2.16
CVa	.34	.29	.54
Min	2.00	2.00	1.00
Max	5.00	4.00	6.00
Co D			
N	4	4	4
Mn	4.25	4.75	4.75
StD	.96	.50	1.26
CVa	.23	.11	.26
Min	3.00	4.00	3.00
Max	5.00	5.00	6.00
Battalion Commander			
N	4	4	4
Mn	4.50	5.25	5.50
StD	1.91	2.22	1.29
CVa	.43	.42	.23
Min	2.00	2.00	4.00
Max	6.00	7.00	7.00

Table D-1

Vehicle Commander's Learning Difficulty Ratings (Cont.)

Vehicle	Coordinate with TOC	Retrieve & review TOC overlays	Operational use of CVCC
S3			
N	4	4	4
Mn	4.50	5.00	5.00
StD	1.29	.82	.82
CVa	.29	.16	.16
Min	3.00	4.00	4.00
Max	6.00	6.00	6.00
TOTAL			
N	24	24	24
Mn	4.13	4.50	4.71
StD	1.15	1.25	1.23
CVa	.28	.28	.26
Min	2.00	2.00	1.00
Max	6.00	7.00	7.00

Table D-2

## Vehicle Commander's Skill and Knowledge Training Emphasis Ratings

Vehicle	Operate SIMNET controls	CITV manual search	CITV auto scan	CITV target designate	Operate in GPS mode
Co A					
N	4	4	4	4	4
Mn	4.25	4.50	5.25	5.25	4.50
StD	1.26	1.29	.50	.96	2.38
CVa	.30	.29	.10	.18	.53
Min	3.00	3.00	5.00	4.00	2.00
Max	6.00	6.00	6.00	6.00	7.00
Co B					
N	4	4	4	4	4
Mn	3.25	4.00	5.00	4.75	4.25
StD	.96	1.41	.82	.96	1.26
CVa	.29	.35	.16	.20	.30
Min	2.00	3.00	4.00	4.00	3.00
Max	4.00	6.00	6.00	6.00	6.00
Co C					
N	4	4	4	4	4
Mn	3.50	3.50	4.75	4.25	4.00
StD	1.00	1.00	.96	.50	.82
CVa	.29	.29	.20	.12	.20
Min	2.00	2.00	4.00	4.00	3.00
Max	4.00	4.00	6.00	5.00	5.00
Co D					
N	4	4	4	4	4
Mn	4.25	4.00	4.75	5.00	4.25
StD	2.06	.82	.50	.82	.50
CVa	.49	.20	.11	.16	.12
Min	2.00	3.00	4.00	4.00	4.00
Max	7.00	5.00	5.00	6.00	5.00
Battalion Commander					
N	4	4	4	4	4
Mn	3.50	4.25	4.25	5.00	3.50
StD	1.29	.96	.50	1.41	1.29
CVa	.37	.23	.12	.28	.37
Min	2.00	3.00	4.00	4.00	2.00
Max	5.00	5.00	5.00	7.00	5.00

Table D-2

Vehicle Commander's Skill and Knowledge Training Emphasis Ratings  
(Cont.)

Vehicle	Operate SIMNET controls	CITV manual search	CITV auto scan	CITV target designate	Operate in GPS mode
<b>S3</b>					
N	3	2	3	3	3
Mn	3.00	4.50	6.00	6.33	4.33
StD	1.00	.71	1.00	1.15	.58
CVa	.33	.16	.17	.18	.13
Min	2.00	4.00	5.00	5.00	4.00
Max	4.00	5.00	7.00	7.00	5.00
<b>TOTAL</b>					
N	23	22	23	23	23
Mn	3.65	4.09	4.96	5.04	4.13
StD	1.27	1.02	.82	1.07	1.22
CVa	.35	.25	.17	.21	.29
Min	2.00	2.00	4.00	4.00	2.00
Max	7.00	6.00	7.00	7.00	7.00

Table D-2

# Vehicle Commander's Skill and Knowledge Training Emphasis Ratings (Cont.)

Vehicle	Operate CCD inputs	Operate CCD map functions	Operate CCD navigate functions	Aggregate CCD icons	Compose reports
Co A					
N	4	4	4	4	4
Mn	6.25	6.25	5.75	5.50	6.50
StD	.50	.50	.50	.58	.58
CVa	.08	.08	.09	.10	.09
Min	6.00	6.00	5.00	5.00	6.00
Max	7.00	7.00	6.00	6.00	7.00
Co B					
N	4	4	4	4	4
Mn	5.00	5.50	5.25	4.25	5.25
StD	1.15	1.29	.96	.50	1.26
CVa	.23	.23	.18	.12	.24
Min	4.00	4.00	4.00	4.00	4.00
Max	6.00	7.00	6.00	5.00	7.00
Co C					
N	4	4	4	4	4
Mn	5.00	5.25	5.50	3.50	5.25
StD	.82	.96	1.29	.58	.50
CVa	.16	.18	.23	.16	.10
Min	4.00	4.00	4.00	3.00	5.00
Max	6.00	6.00	7.00	4.00	6.00
Co D					
N	4	4	4	4	4
Mn	5.75	6.00	6.00	5.25	5.50
StD	.50	0.00	0.00	1.50	1.29
CVa	.09	0.00	0.00	.29	.23
Min	5.00	6.00	6.00	3.00	4.00
Max	6.00	6.00	6.00	6.00	7.00
Battalion Commander					
N	4	4	4	4	4
Mn	6.50	6.75	6.00	4.75	5.00
StD	.58	.50	1.15	2.22	2.16
CVa	.09	.07	.19	.47	.43
Min	6.00	6.00	5.00	2.00	2.00
Max	7.00	7.00	7.00	7.00	7.00

Table D-2

Vehicle Commander's Skill and Knowledge Training Emphasis Ratings  
(Cont.)

Vehicle	Operate CCD inputs	Operate CCD map functions	Operate CCD navigate functions	Aggregate CCD icons	Compose reports
S3					
N	3	3	3	3	3
Mn	5.00	6.00	6.67	3.67	5.33
StD	2.00	1.73	.58	.58	.58
CVa	.40	.29	.09	.16	.11
Min	3.00	4.00	6.00	3.00	5.00
Max	7.00	7.00	7.00	4.00	6.00
TOTAL					
N	23	23	23	23	23
Mn	5.61	5.96	5.83	4.52	5.48
StD	1.08	.98	.89	1.31	1.20
CVa	.19	.16	.15	.29	.22
Min	3.00	4.00	4.00	2.00	2.00
Max	7.00	7.00	7.00	7.00	7.00

Table D-2

Vehicle Commander's Skill and Knowledge Training Emphasis Ratings  
(Cont.)

Vehicle	Retrieve & review reports	Send reports	Coordinate with gunner	Coordinate with driver	Coordinate with other Veh Cdrs
Co A					
N	4	4	4	4	4
Mn	5.25	6.00	5.25	5.00	5.00
StD	.96	.82	1.26	1.41	1.41
CVa	.18	.14	.24	.28	.28
Min	4.00	5.00	4.00	4.00	4.00
Max	6.00	7.00	7.00	7.00	7.00
Co B					
N	4	4	4	4	4
Mn	5.25	5.25	5.50	4.75	5.25
StD	1.26	1.26	1.29	1.71	1.26
CVa	.24	.24	.23	.36	.24
Min	4.00	4.00	4.00	3.00	4.00
Max	7.00	7.00	7.00	7.00	7.00
Co C					
N	4	4	4	4	4
Mn	5.25	5.75	4.50	4.50	5.25
StD	.96	.50	1.00	1.00	.96
CVa	.18	.09	.22	.22	.18
Min	4.00	5.00	4.00	4.00	4.00
Max	6.00	6.00	6.00	6.00	6.00
Co D					
N	4	4	4	4	4
Mn	5.75	5.25	5.75	5.75	5.75
StD	1.26	.96	.50	.50	.96
CVa	.22	.18	.09	.09	.17
Min	4.00	4.00	5.00	5.00	5.00
Max	7.00	6.00	6.00	6.00	7.00
Battalion Commander					
N	4	4	4	4	4
Mn	5.75	5.50	4.25	3.75	4.75
StD	1.26	1.29	1.26	.50	2.06
CVa	.22	.23	.30	.13	.43
Min	4.00	4.00	3.00	3.00	2.00
Max	7.00	7.00	6.00	4.00	7.00

Table D-2

Vehicle Commander's Skill and Knowledge Training Emphasis Ratings  
(Cont.)

Vehicle	Retrieve & review reports	Send reports	Coordinate with gunner	Coordinate with driver	Coordinate with other Veh Cdrs
S3					
N	3	3	3	3	3
Mn	5.67	4.67	6.33	5.00	4.67
Std	.58	.58	.58	1.00	2.08
CVa	.10	.12	.09	.20	.45
Min	5.00	4.00	6.00	4.00	3.00
Max	6.00	5.00	7.00	6.00	7.00
TOTAL					
N	23	23	23	23	23
Mn	5.48	5.43	5.22	4.78	5.13
Std	.99	.95	1.17	1.17	1.36
CVa	.18	.17	.22	.24	.26
Min	4.00	4.00	3.00	3.00	2.00
Max	7.00	7.00	7.00	7.00	7.00

Table D-2

Vehicle Commander's Future Training Requirements:  
Skills and Knowledges (Cont.)

Vehicle	Coordinate with TOC	Retrieve & review TOC overlays	Operational use of CVCC
Co A			
N	4	4	4
Mn	5.00	5.25	5.75
StD	.82	1.26	1.26
CVa	.16	.24	.22
Min	4.00	4.00	4.00
Max	6.00	7.00	7.00
Co B			
N	4	4	4
Mn	5.00	4.75	5.25
StD	.82	1.50	.96
CVa	.16	.32	.18
Min	4.00	3.00	4.00
Max	6.00	6.00	6.00
Co C			
N	4	4	4
Mn	4.75	5.50	6.00
StD	.50	.58	.82
CVa	.11	.10	.14
Min	4.00	5.00	5.00
Max	5.00	6.00	7.00
Co D			
N	4	4	4
Mn	6.00	6.25	6.00
StD	.82	.50	.82
CVa	.14	.08	.14
Min	5.00	6.00	5.00
Max	7.00	7.00	7.00
Battalion Commander			
N	4	4	4
Mn	5.25	5.75	6.25
StD	2.22	1.26	.96
CVa	.42	.22	.15
Min	2.00	4.00	5.00
Max	7.00	7.00	7.00

Table D-2

Vehicle Commander's Skill and Knowledge Training Emphasis Ratings  
(Cont.)

Vehicle	Coordinate with TOC	Retrieve & review TOC overlays	Operational use of CVCC
S3			
N	3	3	3
Mn	4.67	5.67	6.00
StD	1.53	.58	0.00
CVa	.33	.10	0.00
Min	3.00	5.00	6.00
Max	6.00	6.00	6.00
TOTAL			
N	23	23	23
Mn	5.13	5.52	5.87
StD	1.18	1.04	.87
CVa	.23	.19	.15
Min	2.00	3.00	4.00
Max	7.00	7.00	7.00

Table D-3

## Vehicle Commander's Task Training Emphasis Ratings

Vehicle	SPOT report	CONTACT report	SHELL report	CALL FOR FIRE report	SITUATION report
Co A					
N	4	4	4	4	4
Mn	5.50	4.50	3.50	4.25	5.25
StD	.58	.58	.58	.96	1.26
CVa	.10	.13	.16	.23	.24
Min	5.00	4.00	3.00	3.00	4.00
Max	6.00	5.00	4.00	5.00	7.00
Co B					
N	4	4	4	3	4
Mn	4.75	4.50	3.50	3.67	4.50
StD	1.71	2.08	1.29	1.53	1.29
CVa	.36	.46	.37	.42	.29
Min	3.00	2.00	2.00	2.00	3.00
Max	7.00	7.00	5.00	5.00	6.00
Co C					
N	4	4	4	4	4
Mn	4.75	3.50	3.25	4.75	5.25
StD	.96	1.91	.50	.96	.96
CVa	.20	.55	.15	.20	.18
Min	4.00	1.00	3.00	4.00	4.00
Max	6.00	5.00	4.00	6.00	6.00
Co D					
N	4	4	4	4	4
Mn	4.25	3.75	3.50	4.50	5.00
StD	1.71	1.71	1.00	1.91	1.15
CVa	.40	.46	.29	.43	.23
Min	2.00	2.00	2.00	2.00	4.00
Max	6.00	6.00	4.00	6.00	6.00
Battalion Commander					
N	4	4	4	4	4
Mn	5.75	4.25	3.25	5.00	5.00
StD	1.50	2.06	.96	1.41	1.41
CVa	.26	.49	.29	.28	.28
Min	4.00	2.00	2.00	4.00	4.00
Max	7.00	7.00	4.00	7.00	7.00

Table D-3

## Vehicle Commander's Task Training Emphasis Ratings (Cont.)

Vehicle	SPOT report	CONTACT report	SHELL report	CALL FOR FIRE report	SITUATION report
S3					
N	3	3	3	3	3
Mn	6.00	4.00	4.00	5.33	5.00
StD	1.73	3.00	2.00	1.53	1.00
CVa	.29	.75	.50	.29	.20
Min	4.00	1.00	2.00	4.00	4.00
Max	7.00	7.00	6.00	7.00	6.00
TOTAL					
N	23	23	23	22	23
Mn	5.13	4.09	3.48	4.59	5.00
StD	1.39	1.76	.99	1.33	1.09
CVa	.27	.43	.29	.29	.22
Min	2.00	1.00	2.00	2.00	3.00
Max	7.00	7.00	6.00	7.00	7.00

Table D-3

## Vehicle Commander's Task Training Emphasis Ratings (Cont.)

Vehicle	Direct gunner	Determine location	Direct scheme of maneuver	Monitor route progress	Correct company position with battalion
Co A					
N	4	4	4	4	4
Mn	5.25	5.00	5.50	5.00	5.25
StD	1.26	1.83	1.29	1.63	1.26
CVa	.24	.37	.23	.33	.24
Min	4.00	3.00	4.00	3.00	4.00
Max	7.00	7.00	7.00	7.00	7.00
Co B					
N	4	4	4	4	4
Mn	3.50	2.50	5.00	4.00	4.00
StD	1.29	1.91	1.41	1.63	1.63
CVa	.37	.77	.28	.41	.41
Min	2.00	1.00	3.00	2.00	2.00
Max	5.00	5.00	6.00	6.00	6.00
Co C					
N	4	4	4	4	4
Mn	4.00	4.75	5.25	5.00	5.00
StD	1.63	.96	.50	.82	.82
CVa	.41	.20	.10	.16	.16
Min	2.00	4.00	5.00	4.00	4.00
Max	6.00	6.00	6.00	6.00	6.00
Co D					
N	4	4	4	4	4
Mn	3.25	4.25	4.75	4.25	4.50
StD	1.50	1.71	.50	1.71	1.73
CVa	.46	.40	.11	.40	.38
Min	2.00	2.00	4.00	2.00	2.00
Max	5.00	6.00	5.00	6.00	6.00
Battalion Commander					
N	4	4	4	4	4
Mn	3.25	3.75	5.25	4.25	4.50
StD	2.22	1.89	2.87	1.26	.58
CVa	.68	.50	.55	.30	.13
Min	1.00	1.00	1.00	3.00	4.00
Max	6.00	5.00	7.00	6.00	5.00

Table D-3

## Vehicle Commander's Task Training Emphasis Ratings (Cont.)

Vehicle	Direct gunner	Determine location	Direct scheme of maneuver	Monitor route progress	Correct company position with battalion
S3					
N	3	3	3	3	3
Mn	6.00	4.67	6.33	4.33	5.00
StD	1.00	2.52	.58	1.15	1.73
CVa	.17	.54	.09	.27	.35
Min	5.00	2.00	6.00	3.00	3.00
Max	7.00	7.00	7.00	5.00	6.00
TOTAL					
N	23	23	23	23	23
Mn	4.13	4.13	5.30	4.48	4.70
StD	1.71	1.82	1.40	1.31	1.26
CVa	.41	.44	.26	.29	.27
Min	1.00	1.00	1.00	2.00	2.00
Max	7.00	7.00	7.00	7.00	7.00

Table D-3

Vehicle Commander's Future Training Requirements: Training  
Emphasis (Cont.)

Vehicle	Revise tactical plan	Coordinate sector searches
Co A		
N	3	4
Mn	5.00	4.75
StD	1.00	.50
CVa	.20	.11
Min	4.00	4.00
Max	6.00	5.00
Co B		
N	4	4
Mn	5.00	5.00
StD	1.41	1.41
CVa	.28	.28
Min	3.00	3.00
Max	6.00	6.00
Co C		
N	4	4
Mn	5.25	4.75
StD	.96	1.26
CVa	.18	.26
Min	4.00	3.00
Max	6.00	6.00
Co D		
N	4	4
Mn	5.50	5.50
StD	1.29	1.00
CVa	.23	.18
Min	4.00	5.00
Max	7.00	7.00
Battalion Commander		
N	4	4
Mn	6.25	3.50
StD	.96	1.29
CVa	.15	.37
Min	5.00	2.00
Max	7.00	5.00

Table D-3

Vehicle Commander's Task Training Emphasis Ratings (Cont.)

Vehicle	Revise tactical plan	Coordinate sector searches
S3		
N	3	3
Mn	6.33	5.67
StD	.58	.58
CVa	.09	.10
Min	6.00	5.00
Max	7.00	6.00
TOTAL		
N	22	23
Mn	5.55	4.83
StD	1.10	1.19
CVa	.20	.25
Min	3.00	2.00
Max	7.00	7.00

Table D-4

## TOC Personnel Learning Difficulty Ratings

Type position	Station	Basic computer skills	Create overlays	Edit overlays	Send overlays	Aggregate/disaggregate friendly icons
Officers XO						
	N	4	4	4	4	4
	Mn	3.75	5.50	5.25	2.75	2.75
	StD	.50	.58	.50	1.26	.96
	CVa	.13	.10	.10	.46	.35
	Min	3.00	5.00	5.00	1.00	2.00
	Max	4.00	6.00	6.00	4.00	4.00
Ass't S3						
	N	3	3	3	3	3
	Mn	4.67	5.00	5.33	4.67	3.67
	StD	1.15	0.00	.58	.58	1.53
	CVa	.25	0.00	.11	.12	.42
	Min	4.00	5.00	5.00	4.00	2.00
	Max	6.00	5.00	6.00	5.00	5.00
S2						
	N	4	4	4	4	4
	Mn	2.50	4.75	4.25	3.50	3.25
	StD	1.29	.96	.50	1.00	1.71
	CVa	.52	.20	.12	.29	.53
	Min	1.00	4.00	4.00	2.00	1.00
	Max	4.00	6.00	5.00	4.00	5.00
TOTAL (Officers)		-----				
	N	11	11	11	11	11
	Mn	3.55	5.09	4.91	3.55	3.18
	StD	1.29	.70	.70	1.21	1.33
	CVa	.36	.14	.14	.34	.42
	Min	1.00	4.00	4.00	1.00	1.00
	Max	6.00	6.00	6.00	5.00	5.00

Table D-4

## TOC Personnel Learning Difficulty Ratings (Cont.)

Type position	Station	Basic computer skills	Create overlays	Edit overlays	Send overlays	Aggregate/ disaggregate friendly icons
Enlisted	OPS NCO					
	N	4	4	4	4	4
	Mn	3.75	4.00	3.75	3.00	2.75
	StD	1.71	1.41	2.06	2.45	2.06
	CVa	.46	.35	.55	.82	.75
	Min	2.00	3.00	2.00	1.00	1.00
	Max	6.00	6.00	6.00	6.00	5.00
	INTEL NCO					
	N	4	4	4	4	4
	Mn	3.25	4.00	4.00	4.00	3.75
	StD	1.71	.82	.82	.82	.96
	CVa	.53	.20	.20	.20	.26
	Min	1.00	3.00	3.00	3.00	3.00
	Max	5.00	5.00	5.00	5.00	5.00
TOTAL (Enlisted)		-----				
	N	8	8	8	8	8
	Mn	3.50	4.00	3.88	3.50	3.25
	StD	1.60	1.07	1.46	1.77	1.58
	CVa	.46	.27	.38	.51	.49
	Min	1.00	3.00	2.00	1.00	1.00
	Max	6.00	6.00	6.00	6.00	5.00
TOTAL (Officers & Enlisted)		-----				
	N	19	19	19	19	19
	Mn	3.53	4.63	4.47	3.53	3.21
	StD	1.39	1.01	1.17	1.43	1.40
	CVa	.39	.22	.26	.41	.44
	Min	1.00	3.00	2.00	1.00	1.00
	Max	6.00	6.00	6.00	6.00	5.00

Table D-4

## TOC Personnel Learning Difficulty Ratings (Cont.)

Type position	Position	Manipulate message icons	Compose reports	Review vehicle reports	Organize reports	Coordinate with Bn Cdr & S3
Officers	XO					
	N	4	4	4	4	4
	Mn	3.50	4.50	3.25	4.00	4.75
	StD	1.00	1.29	1.71	.82	.96
	CVa	.29	.29	.53	.20	.20
	Min	3.00	3.00	1.00	3.00	4.00
	Max	5.00	6.00	5.00	5.00	6.00
	Ass't S3					
	N	3	3	3	3	3
	Mn	3.33	3.33	3.33	3.67	4.67
	StD	1.53	1.15	1.15	1.53	.58
	CVa	.46	.35	.35	.42	.12
	Min	2.00	2.00	2.00	2.00	4.00
	Max	5.00	4.00	4.00	5.00	5.00
	S2					
	N	4	4	4	4	4
	Mn	3.50	4.25	3.75	4.00	3.75
	StD	1.91	1.26	1.71	2.16	.50
	CVa	.55	.30	.46	.54	.13
	Min	2.00	3.00	2.00	2.00	3.00
	Max	6.00	6.00	6.00	7.00	4.00
TOTAL (Officers)		-----				
	N	11	11	11	11	11
	Mn	3.45	4.09	3.45	3.91	4.36
	StD	1.37	1.22	1.44	1.45	.81
	CVa	.40	.30	.42	.37	.19
	Min	2.00	2.00	1.00	2.00	3.00
	Max	6.00	6.00	6.00	7.00	6.00

Table D-4

## TOC Personnel Learning Difficulty Ratings (Cont.)

Type position	Position	Manipulate message icons	Compose reports	Review vehicle reports	Organize reports	Coordinate with Bn Cdr & S3
Enlisted	OPS NCO					
	N	4	4	4	4	4
	Mn	2.75	4.50	3.25	3.25	4.50
	StD	2.06	1.29	2.06	2.06	2.38
	CVa	.75	.29	.63	.63	.53
	Min	1.00	3.00	1.00	1.00	2.00
	Max	5.00	6.00	5.00	5.00	7.00
	INTEL NCO					
	N	4	4	4	4	4
	Mn	3.50	3.75	3.50	3.75	4.00
	StD	1.29	.96	1.29	.96	.82
	CVa	.37	.26	.37	.26	.20
	Min	2.00	3.00	2.00	3.00	3.00
	Max	5.00	5.00	5.00	5.00	5.00
TOTAL (Enlisted)		-----				
	N	8	8	8	8	8
	Mn	3.13	4.13	3.38	3.50	4.25
	StD	1.64	1.13	1.60	1.51	1.67
	CVa	.53	.27	.47	.43	.39
	Min	1.00	3.00	1.00	1.00	2.00
	Max	5.00	6.00	5.00	5.00	7.00
TOTAL (Officers & Enlisted)		-----				
	N	19	19	19	19	19
	Mn	3.32	4.11	3.42	3.74	4.32
	StD	1.45	1.15	1.46	1.45	1.20
	CVa	.44	.28	.43	.39	.28
	Min	1.00	2.00	1.00	1.00	2.00
	Max	6.00	6.00	6.00	7.00	7.00

Table D-4

## TOC Personnel Learning Difficulty Ratings (Cont.)

Type position	Position	Coordinate with TOC staff	Coordinate with Veh Cdrs	Use of TOC workstations	Potential TOC workstation procedures
Officers	XO				
	N	4	4	4	4
	Mn	4.25	3.25	5.75	5.75
	StD	2.22	2.06	.50	.50
	CVa	.52	.63	.09	.09
	Min	1.00	1.00	5.00	5.00
	Max	6.00	5.00	6.00	6.00
	Ass't S3				
	N	3	3	3	3
	Mn	5.00	5.00	5.00	5.00
	StD	0.00	0.00	1.00	0.00
	CVa	0.00	0.00	.20	0.00
	Min	5.00	5.00	4.00	5.00
	Max	5.00	5.00	6.00	5.00
	S2				
	N	4	4	4	4
	Mn	3.75	3.75	4.50	4.50
	StD	.50	.50	1.73	1.73
	CVa	.13	.13	.38	.38
	Min	3.00	3.00	3.00	3.00
	Max	4.00	4.00	7.00	7.00
-----					
TOTAL (Officers)					
N		11	11	11	11
Mn		4.27	3.91	5.09	5.09
StD		1.35	1.38	1.22	1.14
CVa		.32	.35	.24	.22
Min		1.00	1.00	3.00	3.00
Max		6.00	5.00	7.00	7.00

Table D-4

## TOC Personnel Learning Difficulty (Cont.)

Type position	Position	Coordinate with TOC staff	Coordinate with Veh Cdrs	Use of TOC workstations	Potential TOC workstation procedures
Enlisted	OPS NCO				
	N	4	4	4	4
	Mn	4.75	4.00	5.50	5.25
	StD	1.71	1.83	1.29	1.71
	CVa	.36	.46	.23	.33
	Min	3.00	2.00	4.00	3.00
	Max	7.00	6.00	7.00	7.00
	INTEL NCO				
	N	4	4	4	4
	Mn	4.00	4.00	4.00	4.50
	StD	.82	.82	.82	.58
	CVa	.20	.20	.20	.13
	Min	3.00	3.00	3.00	4.00
	Max	5.00	5.00	5.00	5.00
TOTAL (Enlisted)		-----			
	N	8	8	8	8
	Mn	4.38	4.00	4.75	4.88
	StD	1.30	1.31	1.28	1.25
	CVa	.30	.33	.27	.26
	Min	3.00	2.00	3.00	3.00
	Max	7.00	6.00	7.00	7.00
TOTAL (Officers & Enlisted)		-----			
	N	19	19	19	19
	Mn	4.32	3.95	4.95	5.00
	StD	1.29	1.31	1.22	1.15
	CVa	.30	.33	.25	.23
	Min	1.00	1.00	3.00	3.00
	Max	7.00	6.00	7.00	7.00

Table D-5

## TOC Personnel Skill and Knowledge Training Emphasis Ratings

Type position	Position	Basic computer skills	Create overlays	Edit overlays	Send overlays	Aggregate/ disaggregate friendly icons
Officers	XO					
	N	4	4	4	4	4
	Mn	5.25	6.75	6.50	5.00	4.25
	StD	1.71	.50	1.00	1.83	1.89
	CVa	.33	.07	.15	.37	.45
	Min	3.00	6.00	5.00	3.00	3.00
	Max	7.00	7.00	7.00	7.00	7.00
	Ass't S3					
	N	3	3	3	3	3
	Mn	6.33	6.00	6.00	5.00	5.00
	StD	1.15	0.00	0.00	1.00	1.73
	CVa	.18	0.00	0.00	.20	.35
	Min	5.00	6.00	6.00	4.00	3.00
	Max	7.00	6.00	6.00	6.00	6.00
	S2					
	N	4	4	4	4	4
	Mn	4.00	7.00	7.00	5.75	3.50
	StD	0.00	0.00	0.00	1.50	2.08
	CVa	0.00	0.00	0.00	.26	.59
	Min	4.00	7.00	7.00	4.00	1.00
	Max	4.00	7.00	7.00	7.00	6.00
TOTAL (Officers)		-----				
	N	11	11	11	11	11
	Mn	5.09	6.64	6.55	5.27	4.18
	StD	1.45	.50	.69	1.42	1.83
	CVa	.28	.08	.11	.27	.44
	Min	3.00	6.00	5.00	3.00	1.00
	Max	7.00	7.00	7.00	7.00	7.00

Table D-5

TOC Personnel Skill and Knowledge Training Emphasis Ratings  
(Cont.)

Type position	Position	Basic computer skills	Create overlays	Edit overlays	Send overlays	Aggregate/ disaggregate friendly icons
Enlisted	OPS NCO					
	N	4	4	4	4	4
	Mn	5.00	6.25	6.25	3.50	3.75
	StD	1.41	.96	.96	1.91	1.50
	CVa	.28	.15	.15	.55	.40
	Min	4.00	5.00	5.00	2.00	2.00
	Max	7.00	7.00	7.00	6.00	5.00
	INTEL NCO					
	N	4	4	4	4	4
	Mn	4.25	5.25	5.25	4.75	3.75
	StD	.96	.50	.96	.96	.50
	CVa	.23	.10	.18	.20	.13
	Min	3.00	5.00	4.00	4.00	3.00
	Max	5.00	6.00	6.00	6.00	4.00
TOTAL (Enlisted)		-----				
	N	8	8	8	8	8
	Mn	4.63	5.75	5.75	4.13	3.75
	StD	1.19	.89	1.04	1.55	1.04
	CVa	.26	.15	.18	.38	.28
	Min	3.00	5.00	4.00	2.00	2.00
	Max	7.00	7.00	7.00	6.00	5.00
TOTAL (Officers & Enlisted)		-----				
	N	19	19	19	19	19
	Mn	4.89	6.26	6.21	4.79	4.00
	StD	1.33	.81	.92	1.55	1.53
	CVa	.27	.13	.15	.32	.38
	Min	3.00	5.00	4.00	2.00	1.00
	Max	7.00	7.00	7.00	7.00	7.00

Table D-5

TOC Personnel Skill and Knowledge Training Emphasis Ratings  
(Cont.)

Type position	Position	Manipulate message icons	Compose reports	Review vehicle reports	Organize reports	Coordinate with Bn Cdr & S3
Officers	XO					
	N	4	4	4	4	4
	Mn	5.25	5.50	4.75	4.75	6.25
	StD	1.50	1.73	1.26	1.26	1.50
	CVa	.29	.31	.26	.26	.24
	Min	4.00	3.00	3.00	3.00	4.00
	Max	7.00	7.00	6.00	6.00	7.00
	Ass't S3					
	N	3	3	3	3	3
	Mn	5.67	6.00	5.33	5.33	6.00
	StD	2.31	1.00	1.15	1.53	1.73
	CVa	.41	.17	.22	.29	.29
	Min	3.00	5.00	4.00	4.00	4.00
	Max	7.00	7.00	6.00	7.00	7.00
	S2					
	N	4	4	4	4	4
	Mn	5.50	6.00	5.75	5.00	6.00
	StD	1.29	1.41	1.26	.82	.82
	CVa	.23	.24	.22	.16	.14
	Min	4.00	4.00	4.00	4.00	5.00
	Max	7.00	7.00	7.00	6.00	7.00
TOTAL (Officers)		- - - - -	- - - - -	- - - - -	- - - - -	- - - - -
	N	11	11	11	11	11
	Mn	5.45	5.82	5.27	5.00	6.09
	StD	1.51	1.33	1.19	1.10	1.22
	CVa	.28	.23	.23	.22	.20
	Min	3.00	3.00	3.00	3.00	4.00
	Max	7.00	7.00	7.00	7.00	7.00

Table D-5

TOC Personnel Skill and Knowledge Training Emphasis Ratings  
(Cont.)

Type position	Position	Manipulate message icons	Compose reports	Review vehicle reports	Organize reports	Coordinate with Bn Cdr & S3
Enlisted	OPS NCO					
	N	4	4	4	4	4
	Mn	3.75	5.50	4.00	4.50	5.00
	StD	1.89	.58	2.16	1.73	2.00
	CVa	.50	.10	.54	.38	.40
	Min	1.00	5.00	1.00	2.00	2.00
	Max	5.00	6.00	6.00	6.00	6.00
	INTEL NCO					
	N	4	4	4	4	4
	Mn	4.25	4.25	4.25	4.50	5.25
	StD	1.26	1.26	1.26	1.29	.96
	CVa	.30	.30	.30	.29	.18
	Min	3.00	3.00	3.00	3.00	4.00
	Max	6.00	6.00	6.00	6.00	6.00
TOTAL (Enlisted)		-----				
	N	8	8	8	8	8
	Mn	4.00	4.88	4.13	4.50	5.13
	StD	1.51	1.13	1.64	1.41	1.46
	CVa	.38	.23	.40	.31	.28
	Min	1.00	3.00	1.00	2.00	2.00
	Max	6.00	6.00	6.00	6.00	6.00
TOTAL (Officers & Enlisted)		-----				
	N	19	19	19	19	19
	Mn	4.84	5.42	4.79	4.79	5.68
	StD	1.64	1.30	1.47	1.23	1.38
	CVa	.34	.24	.31	.26	.24
	Min	1.00	3.00	1.00	2.00	2.00
	Max	7.00	7.00	7.00	7.00	7.00

Table D-5

TOC Personnel Skill and Knowledge Training Emphasis Ratings  
(Cont.)

Type position	Position	Coordinate with TOC staff	Coordinate with Veh Cdrs	Use of TOC workstations	Potential TOC workstation procedures
Officers	XO				
	N	4	4	4	4
	Mn	6.25	4.50	6.75	6.50
	StD	1.50	3.00	.50	1.00
	CVa	.24	.67	.07	.15
	Min	4.00	1.00	6.00	5.00
	Max	7.00	7.00	7.00	7.00
	Ass't S3				
	N	3	3	3	3
	Mn	6.33	6.33	6.00	6.33
	StD	1.15	1.15	0.00	.58
	CVa	.18	.18	0.00	.09
	Min	5.00	5.00	6.00	6.00
	Max	7.00	7.00	6.00	7.00
	S2				
	N	4	4	4	4
	Mn	5.75	4.50	6.25	5.50
	StD	.96	1.29	.50	1.73
	CVa	.17	.29	.08	.31
	Min	5.00	3.00	6.00	3.00
	Max	7.00	6.00	7.00	7.00
TOTAL (Officers)		-----			
	N	11	11	11	11
	Mn	6.09	5.00	6.36	6.09
	StD	1.14	2.05	.50	1.22
	CVa	.19	.41	.08	.20
	Min	4.00	1.00	6.00	3.00
	Max	7.00	7.00	7.00	7.00

Table D-5

TOC Personnel Skill and Knowledge Training Emphasis Ratings  
(Cont.)

Type position	Position	Coordinate with TOC staff	Coordinate with Veh Cdrs	Use of TOC workstations	Potential TOC workstation procedures
Enlisted	OPS NCO				
	N	4	4	4	4
	Mn	5.75	5.75	6.50	6.50
	StD	.50	.50	1.00	1.00
	CVa	.09	.09	.15	.15
	Min	5.00	5.00	5.00	5.00
	Max	6.00	6.00	7.00	7.00
	INTEL NCO				
	N	4	4	4	4
	Mn	5.25	5.25	5.75	5.75
	StD	.96	.50	.96	.96
	CVa	.18	.10	.17	.17
	Min	4.00	5.00	5.00	5.00
	Max	6.00	6.00	7.00	7.00
	TOTAL (Enlisted)	-----			
	N	8	8	8	8
	Mn	5.50	5.50	6.13	6.13
	StD	.76	.53	.99	.99
	CVa	.14	.10	.16	.16
	Min	4.00	5.00	5.00	5.00
	Max	6.00	6.00	7.00	7.00
	TOTAL (Officers & Enlisted)	-----			
	N	19	19	19	19
	Mn	5.84	5.21	6.26	6.11
	StD	1.01	1.58	.73	1.10
	CVa	.17	.30	.12	.18
	Min	4.00	1.00	5.00	3.00
	Max	7.00	7.00	7.00	7.00

Table D-6

## TOC Personnel Task Training Emphasis Ratings

Type position	Position	Maintain section journal & journal file	Prepare situation map	Process incoming info	Determine threat courses of action	Prepare overlay
Officers	XO					
	N	4	4	4	4	4
	Mn	4.25	6.75	5.00	5.75	6.00
	StD	2.06	.50	.82	1.26	1.15
	CVa	.49	.07	.16	.22	.19
	Min	2.00	6.00	4.00	4.00	5.00
	Max	7.00	7.00	6.00	7.00	7.00
	Ass't S3					
	N	3	3	3	3	3
	Mn	4.33	6.00	5.67	6.00	6.33
	StD	2.31	1.73	1.15	1.00	1.15
	CVa	.53	.29	.20	.17	.18
	Min	3.00	4.00	5.00	5.00	5.00
	Max	7.00	7.00	7.00	7.00	7.00
	S2					
	N	4	4	4	4	4
	Mn	4.25	5.25	5.00	6.25	6.25
	StD	.50	1.50	1.41	1.50	1.50
	CVa	.12	.29	.28	.24	.24
	Min	4.00	4.00	4.00	4.00	4.00
	Max	5.00	7.00	7.00	7.00	7.00
TOTAL (Officers)		-----				
	N	11	11	11	11	11
	Mn	4.27	6.00	5.18	6.00	6.18
	StD	1.56	1.34	1.08	1.18	1.17
	CVa	.36	.22	.21	.20	.19
	Min	2.00	4.00	4.00	4.00	4.00
	Max	7.00	7.00	7.00	7.00	7.00

Table D-6

## TOC Personnel Task Training Emphasis Ratings (Cont.)

Type position	Position	Maintain section journal & journal file	Prepare situation map	Process incoming info	Determine threat courses of action	Prepare overlay
Enlisted	OPS NCO					
	N	4	4	4	4	4
	Mn	4.50	6.50	5.00	5.00	6.50
	StD	1.73	.58	1.41	3.37	.58
	CVa	.38	.09	.28	.67	.09
	Min	3.00	6.00	4.00	0.00	6.00
	Max	7.00	7.00	7.00	7.00	7.00
	INTEL NCO					
	N	4	4	4	4	4
	Mn	3.25	5.25	4.50	6.00	5.25
	StD	.50	.50	1.29	.82	.50
	CVa	.15	.10	.29	.14	.10
	Min	3.00	5.00	3.00	5.00	5.00
	Max	4.00	6.00	6.00	7.00	6.00
TOTAL (Enlisted)		-----				
	N	8	8	8	8	8
	Mn	3.88	5.88	4.75	5.50	5.88
	StD	1.36	.83	1.28	2.33	.83
	CVa	.35	.14	.27	.42	.14
	Min	3.00	5.00	3.00	0.00	5.00
	Max	7.00	7.00	7.00	7.00	7.00
TOTAL (Officers & Enlisted)		-----				
	N	19	19	19	19	19
	Mn	4.11	5.95	5.00	5.79	6.05
	StD	1.45	1.13	1.15	1.72	1.2
	CVa	.35	.19	.23	.30	.17
	Min	2.00	4.00	3.00	0.00	4.00
	Max	7.00	7.00	7.00	7.00	7.00

Table D-6

## TOC Personnel Task Training Emphasis Ratings (Cont.)

Type position	Position	Disseminate information to battalion	Monitor battle & determine change	Prepare battalion FRAGO	Identify friendly courses of action	Evaluate incoming info
Officers	XO					
	N	4	4	4	4	4
	Mn	5.75	6.25	5.75	6.25	5.75
	StD	.96	.96	1.26	.96	1.89
	CVa	.17	.15	.22	.15	.33
	Min	5.00	5.00	4.00	5.00	3.00
	Max	7.00	7.00	7.00	7.00	7.00
	Ass't S3					
	N	3	3	3	3	3
	Mn	6.33	6.33	6.00	5.67	5.33
	StD	1.15	1.15	1.73	1.53	2.08
	CVa	.18	.18	.29	.27	.39
	Min	5.00	5.00	4.00	4.00	3.00
	Max	7.00	7.00	7.00	7.00	7.00
	S2					
	N	4	4	4	4	4
	Mn	6.25	6.25	5.75	4.00	5.50
	StD	1.50	1.50	1.50	2.94	1.29
	CVa	.24	.24	.26	.74	.23
	Min	4.00	4.00	4.00	0.00	4.00
	Max	7.00	7.00	7.00	7.00	7.00
TOTAL (Officers)		-----				
	N	11	11	11	11	11
	Mn	6.09	6.27	5.82	5.27	5.55
	StD	1.14	1.10	1.33	2.10	1.57
	CVa	.19	.18	.23	.40	.28
	Min	4.00	4.00	4.00	0.00	3.00
	Max	7.00	7.00	7.00	7.00	7.00

Table D-6

## TOC Personnel Task Training Emphasis Ratings (Cont.)

Type position	Position	Disseminate information to battalion	Monitor battle & determine change	Prepare battalion FRAGO	Identify friendly courses of action	Evaluate incoming info
Enlisted	OPS NCO					
	N	4	4	4	4	4
	Mn	5.00	5.75	6.00	5.75	6.25
	StD	1.15	1.26	.82	.50	.96
	CVa	.23	.22	.14	.09	.15
	Min	4.00	4.00	5.00	5.00	5.00
	Max	6.00	7.00	7.00	6.00	7.00
	INTEL NCO					
	N	4	4	4	4	4
	Mn	5.00	5.50	5.25	3.75	5.75
	StD	0.00	1.00	.96	2.50	.96
	CVa	0.00	.18	.18	.67	.17
	Min	5.00	5.00	4.00	0.00	5.00
	Max	5.00	7.00	6.00	5.00	7.00
TOTAL (Enlisted)		- - - - -	- - - - -	- - - - -	- - - - -	- - - - -
	N	8	8	8	8	8
	Mn	5.00	5.63	5.63	4.75	6.00
	StD	.76	1.06	.92	1.98	.93
	CVa	.15	.19	.16	.42	.15
	Min	4.00	4.00	4.00	0.00	5.00
	Max	6.00	7.00	7.00	6.00	7.00
TOTAL (Officers & Enlisted)						
	N	19	19	19	19	19
	Mn	5.63	6.00	5.74	5.05	5.74
	StD	1.12	1.11	1.15	2.01	1.33
	CVa	.20	.18	.20	.40	.23
	Min	4.00	4.00	4.00	0.00	3.00
	Max	7.00	7.00	7.00	7.00	7.00

Table D-6

## TOC Personnel Task Training Emphasis Ratings (Cont.)

Type position	Position	Monitor maintenance section journal	Monitor maintenance situation map	Supervise threat evaluation	Supervise disseminate information	Present situation update
Officers	XO					
	N	4	4	4	4	4
	Mn	5.25	5.00	5.00	5.00	6.25
	StD	.50	1.41	1.41	.82	.96
	CVa	.10	.28	.28	.16	.15
	Min	5.00	3.00	3.00	4.00	5.00
	Max	6.00	6.00	6.00	6.00	7.00
	Ass't S3					
	N	3	3	3	3	3
	Mn	4.00	5.33	5.67	6.00	6.00
	StD	1.73	2.08	2.31	1.73	1.73
	CVa	.43	.39	.41	.29	.29
	Min	3.00	3.00	3.00	4.00	4.00
	Max	6.00	7.00	7.00	7.00	7.00
	S2					
	N	4	4	4	4	4
	Mn	4.00	4.75	6.00	6.00	6.25
	StD	.82	1.71	1.41	1.41	1.50
	CVa	.20	.36	.24	.24	.24
	Min	3.00	3.00	4.00	4.00	4.00
	Max	5.00	7.00	7.00	7.00	7.00
TOTAL (Officers)		-----				
	N	11	11	11	11	11
	Mn	4.45	5.00	5.55	5.64	6.18
	StD	1.13	1.55	1.57	1.29	1.25
	CVa	.25	.31	.28	.23	.20
	Min	3.00	3.00	3.00	4.00	4.00
	Max	6.00	7.00	7.00	7.00	7.00

Table D-6

## TOC Personnel Task Training Emphasis Ratings (Cont.)

Type position	Position	Monitor maintenance section journal	Monitor maintenance situation map	Supervise threat evaluation	Supervise disseminate information	Present situation update
Enlisted	OPS NCO					
	N	4	4	4	4	4
	Mn	1.75	2.25	2.25	2.50	7.00
	StD	2.06	2.63	2.63	3.00	0.00
	CVa	1.18	1.17	1.17	1.20	0.00
	Min	0.00	0.00	0.00	0.00	7.00
	Max	4.00	5.00	5.00	6.00	7.00
	INTEL NCO					
	N	4	4	4	4	4
	Mn	3.00	3.75	3.75	3.75	5.50
	StD	2.00	2.50	2.63	2.63	.58
	CVa	.67	.67	.70	.70	.10
	Min	0.00	0.00	0.00	0.00	5.00
	Max	4.00	5.00	6.00	6.00	6.00
TOTAL (Enlisted)		- - - - -	- - - - -	- - - - -	- - - - -	- - - - -
	N	8	8	8	8	8
	Mn	2.38	3.00	3.00	3.12	6.25
	StD	2.00	2.51	2.56	2.70	.89
	CVa	.84	.84	.85	.86	.14
	Min	0.00	0.00	0.00	0.00	5.00
	Max	4.00	5.00	6.00	6.00	7.00
TOTAL (Officers & Enlisted)						
	N	19	19	19	19	19
	Mn	3.58	4.16	4.47	4.58	6.21
	StD	1.84	2.19	2.37	2.32	1.08
	CVa	.51	.53	.53	.51	.17
	Min	0.00	0.00	0.00	0.00	4.00
	Max	6.00	7.00	7.00	7.00	7.00

Table D-7

## Intercorrelations Between Variables Used in Vehicle Commander Training Requirements Analysis

Training emphasis	Training difficulty								
	SIM	MANS	AUTS	TARD	GPS	INPT	MAPF	NAVF	MAPI
SIM	.4082	.1383	-.3931	.1264	.3838	.4684	.3730	.2288	.4025
MANS	-.0439	.3697	-.2378	.4307	-.1087	.0044	.1253	.0349	-.0391
AUTS	.1686	-.0663	-.2031	.2061	-.5868*	-.1140	-.3092	-.1930	-.1122
TARD	-.1007	-.0734	-.1752	.2279	-.5281*	-.3242	-.1483	-.2134	-.2792
GPS	.1576	.4538	-.2239	.4927*	-.0058	.3827	.2214	.0204	.1919
INPT	.0672	.1484	.1126	.1934	.1146	.3004	.5092*	.3297	.2187
MAPF	.0822	-.0916	-.0554	.1004	.0050	.1991	.3312	.2508	.1640
NAVF	.2701	-.0903	.1616	.0748	-.3520	-.1552	-.1410	.0584	-.0458
MAPI	.0096	-.1607	-.0432	.1309	.0974	.6129*	.4894	.2851	.5370*
CRPT	.2438	.3291	.1900	.4746	.1947	.6059*	.4128	.4103	.4229
RRR	.1215	.2276	.1464	.2651	.2881	.2934	.1110	.1656	.1181
SEND	.1732	.1892	.1159	.2939	-.0290	.2710	.1846	.3670	.2619
CGUN	-.1689	.1442	-.1350	.3865	-.1006	.3797	.1951	-.1759	.2832
CDRV	-.0135	.2394	-.0554	.2789	-.2163	.2857	.1644	-.2021	.1012
COTC	.0623	.2363	.1192	.1897	.3963	.6711**	.4377	.2175	.5183*
CTOC	.3266	.2264	.0641	.2234	.3712	.5674*	.2623	.2058	.3949
ROVL	.2780	.1238	.0255	.2077	.0729	.2596	.1401	.2017	.1508
OPUS	.2533	.1413	-.0671	.2149	.0678	.2429	.1321	.4112	.2241

\*  $p \leq .01$ , one-tailed. \*\*  $p \leq .001$ , one-tailed.

Note.  $n = 22$ . SIM = Operating ADST-unique Controls and Displays (Other than CITV and CCD). MANS = CITV Manual Search. AUTS = CITV Auto Scan. TARD = CITV Target Designate. GPS = Operating in GPS Mode. INPT = Operating CCD Input Devices. MAPF = Operating CCD Map Functions. NAVF = Operating CCD Navigate Functions. MAPI = Aggregation of CCD Map Icons. CRPT = Composing Reports. RRR = Retrieving and Reviewing Reports. SEND = Sending Reports. CGUN = Coordination with Gunner. CDRV = Coordination with Driver. COTC = Coordination with Other Vehicle Commanders. CTOC = Coordination with TOC. ROVL = Retrieving and Reviewing TOC Overlays. OPUS = Operational Use of CVCC.

Table D-7

## Intercorrelations Between Variables Used in Vehicle Commander Training Requirements Analysis (Cont.)

Training emphasis	Training difficulty								
	CRPT	RRR	SEND	CGUN	CDRV	COTC	CTOC	ROVL	OPUS
SIM	.4029	.3532	.4297	.1058	.0214	.1923	.2906	.2704	.0797
MANS	.2444	-.0612	.1292	.0763	-.0666	-.1214	.0647	.0359	.0957
AUTS	.0129	-.2005	-.1324	-.1369	-.0866	-.0581	-.3098	-.2836	-.4666
TARD	-.0238	-.2050	-.0452	-.1752	-.3164	-.1651	-.1542	-.0917	-.1600
GPS	.4779	.1487	.3080	.2653	.1243	.2979	.2737	.2205	.1769
INPT	.3788	.1499	.1996	-.1067	-.1785	.0377	.0906	.2345	.1847
MAPF	.2829	.1968	.1626	-.2802	-.3144	.0000	.0566	.2639	-.0242
NAVF	.0021	-.0920	.0260	-.1118	-.1001	-.0949	-.1898	-.0211	-.1955
MAPI	.6063*	.3943	.4365	-.0582	-.1652	.0309	.2059	.4936*	.2998
CRPT	.6746**	.4029	.4054	.0794	.2096	.1347	.3622	.4934*	.2266
RRR	.3784	.3605	.2453	.0961	.0231	.1630	.4783	.5248*	.1280
SEND	.4194	.1645	.2719	-.1065	.0256	-.1355	.1325	.2608	.1419
CGUN	.3500	.2028	.1939	.3974	.2620	.2932	.2313	.2767	.2616
CDRV	.2948	.0694	.1274	.3293	.2336	.2445	.0590	.0931	.1482
COTC	.3687	.2254	.3310	.5802*	.4237	.5365*	.3423	.3783	.4698
CTOC	.5431*	.5747*	.4270	.2978	.2466	.4459	.5485*	.6435**	.2531
ROVL	.3848	.4577	.4342	.0368	.0120	.1951	.4129	.5545*	.1337
OPUS	.3730	.3708	.4993*	.0219	.0358	.0000	.3424	.4739	.1684

\*  $p \leq .01$ , one-tailed. \*\*  $p \leq .001$ , one-tailed.

Note.  $n = 22$ . SIM = Operating ADST-unique Controls and Displays (Other than CITV and CCD). MANS = CITV Manual Search. AUTS = CITV Auto Scan. TARD = CITV Target Designate. GPS = Operating in GPS Mode. INPT = Operating CCD Input Devices. MAPF = Operating CCD Map Functions. NAVF = Operating CCD Navigate Functions. MAPI = Aggregation of CCD Map Icons. CRPT = Composing Reports. RRR = Retrieving and Reviewing Reports. SEND = Sending Reports. CGUN = Coordination with Gunner. CDRV = Coordination with Driver. COTC = Coordination with Other Vehicle Commanders. CTOC = Coordination with TOC. ROVL = Retrieving and Reviewing TOC Overlays. OPUS = Operational Use of CVCC.

Table D-8

## Intercorrelations Among Variables Used in TOC Training Requirements Analysis

Training emphasis	Training difficulty					
	PCS	COV	EOV	SOV	AGIC	CRPT
BCS	.5433*	.4241	.3547	.1771	.1023	-.1378
COV	-.2299	.1256	-.1981	-.5132	-.4466	-.0316
EOV	-.1353	.0882	-.2011	-.4282	-.2964	.0305
SOV	-.2814	-.0168	-.0950	-.1229	-.0811	-.4238
AGIC	.2880	.0000	.1241	-.1018	.1822	-.1898
MMI	.0141	.1972	.2431	-.0337	.2574	.0682
CRPT	.0242	-.0022	.0803	-.2746	-.0513	.1170
REVR	-.1598	.0941	.2215	-.0236	.2922	.0466
ORGR	.0034	.3365	.3046	.1933	.1891	-.1015
CORD	.0917	.3507	.3733	.1457	.2964	.0924
COTS	.2593	.2108	.1131	-.0928	-.0536	-.0802
COTC	.3003	-.1569	-.1465	.0465	.0793	-.3179
OPUS	-.0344	-.0118	-.2176	-.5106	-.3280	.0312
POTP	.0344	.1366	-.0408	-.0725	-.3765	-.3167

\*p ≤ .01, one-tailed.

Note. n = 19. BCS = Basic Computer Skills. COV = Creation of Overlays. EOV = Editing of Overlays. SOV = Sending of Overlays. AGIC = Aggregating/Disaggregating of Overlays. MMI = Manipulating Message Icons. CRPT = Composing Reports. REVR = Reviewing Reports from Vehicles. ORGR = Organizing Reports. CORD = Coordination with Battalion Commander and S3. COTS = Coordination among TOC Staff. COTC = Coordination with Vehicle Commanders. OPUS = Operational Usage of TOC workstations. POTP = Potential TOC Workstation Operational Procedures.

Table D-8

## Intercorrelations Among Variables Used in TOC Training Requirements Analysis (Cont.)

Training emphasis	Training difficulty						
	REVR	ORGR	CORD	COTS	COTC	OPUS	POTP
BCS	-.2043	.0137	.2649	.1174	.0604	.2014	.2172
COV	-.3815	-.2709	-.4340	-.2975	-.5120	.1275	.0000
EOV	-.3589	-.2488	-.4657	-.2932	-.4982	.0599	-.1049
SOV	-.4486	-.2741	-.3795	-.5753*	-.3615	-.5926*	-.5904*
AGIC	-.1738	.0754	.0906	-.2250	-.1664	-.0892	-.0630
MMI	.1447	.3557	.0547	-.0537	-.1589	-.0597	.0293
CRPT	-.0398	.0914	.0168	.0156	-.1812	.2583	.2951
REVR	.2233	.4412	.1021	-.1671	-.0635	-.0680	-.0326
ORGR	.1446	.3422	.2352	-.0258	-.0073	-.1187	-.1175
CORD	.0145	.1791	.1640	-.0033	-.0713	-.1424	-.1049
COTS	-.4761	-.3327	-.0933	-.0446	-.2572	-.0518	-.0474
COTC	-.4952	-.3866	-.0950	-.2241	-.0211	-.2806	-.2734
OPUS	-.3156	-.1405	-.2880	-.1510	-.4469	.3258	.2624
POTP	-.6494*	-.6098*	-.1942	-.0637	-.3040	-.2020	-.2624

\*p ≤ .01, one-tailed.

Note. n = 19. BCS = Basic Computer Skills. COV = Creation of Overlays. EOVR = Editing of Overlays. SOV = Sending of Overlays. AGIC = Aggregating/Disaggregating of Overlays.

MMI = Manipulating Message Icons. CRPT = Composing Reports. REVR = Reviewing Reports from Vehicles. ORGR = Organizing Reports. CORD = Coordination with Battalion Commander and S3. COTS = Coordination among TOC Staff. COTC = Coordination with Vehicle Commanders. OPUS = Operational Usage of TOC workstations. POTP = Potential TOC Workstation Operational Procedures.